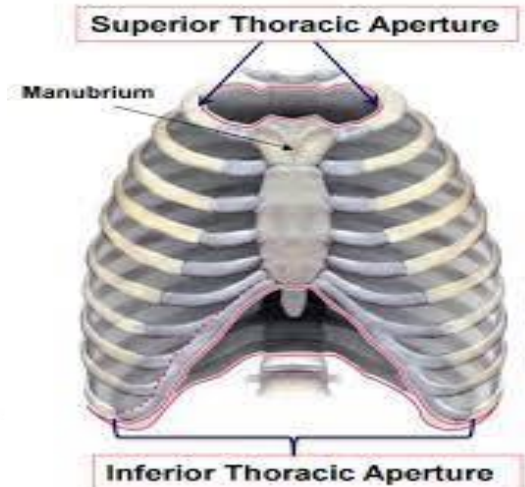
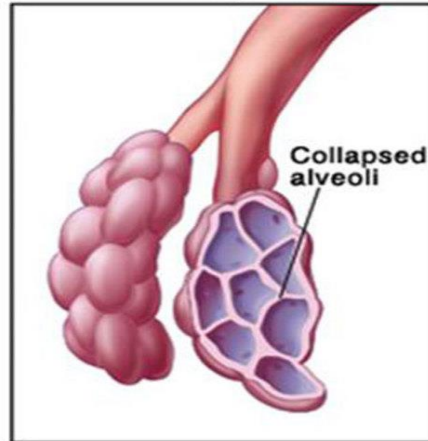
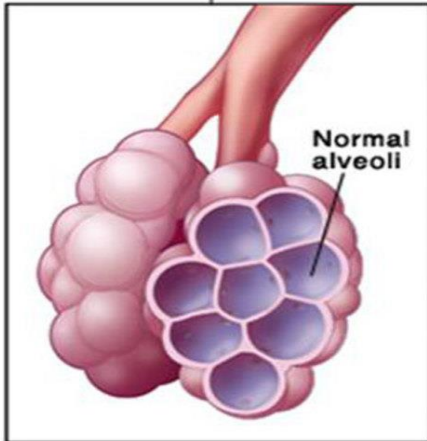
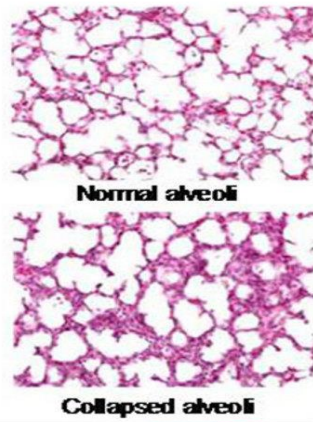
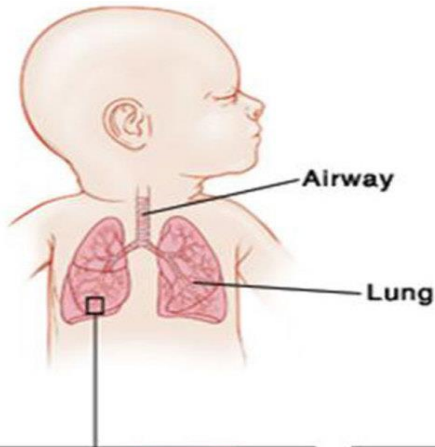


# STUDY GUIDE

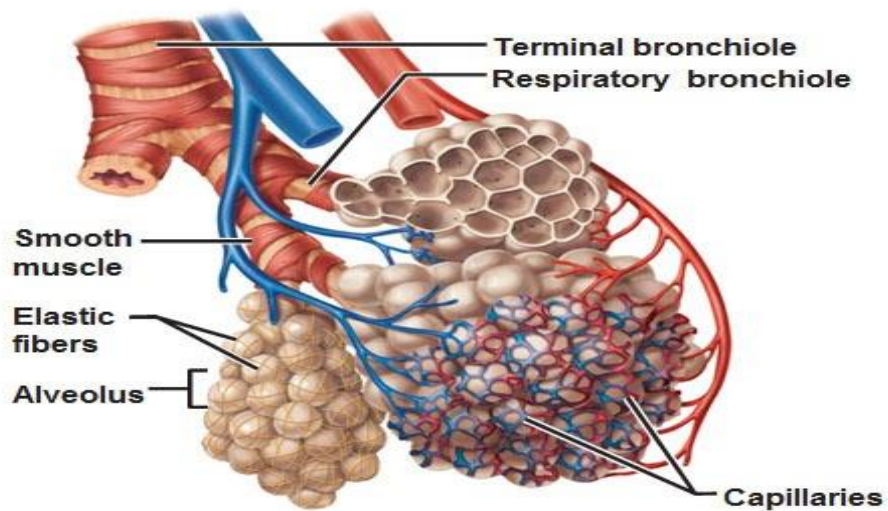
## FIRST YEAR MBBS

1<sup>ST</sup> AUG- 25<sup>TH</sup> AUG 2022

DURATION: 4 WEEKS



### Diagrammatic view of capillary-alveoli relationships



# RESPIRATORY MODULE I



LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE

Institute for Postgraduate Medical Studies & Health Science



## **STUDY GUIDE FOR RESPIRATORY SYSTEM-I MODULE**

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Module name: Respiratory System I

Year: one

Duration: 4 weeks (Aug-2022)

Timetable hours: Lectures, Case-Based Learning (CBL), Laboratory, Practical, Demonstrations, Skills, Self- Directed Learning, Flipped Classroom

### MODULE INTEGRATED COMMITTEE

<b>MODULE COORDINATOR</b>	Prof. Ahsan Ashfaq ( <b>Physiology</b> )
<b>CO-COORDINATOR</b>	Dr. Fatima Rehman ( <b>Anatomy</b> )

### DEPARTMENTS & RESOURCE PERSONS

<b>BASIC HEALTH SCIENCES</b>
<b>ANATOMY</b> Professor Zia-ul-Islam
<b>BIOCHEMISTRY</b> Professor Kashif Nisar
<b>PHYSIOLOGY</b> Professor Syed Hafeezul Hassan
<b>DEPARTMENT of HEALTH PROFESSIONS EDUCATION</b>
<ul style="list-style-type: none"> <li>• Professor Nighat Huda</li> <li>• Professor Sobia Ali</li> <li>• Dr. Afifa Tabassum</li> <li>• Dr. Sana Shah</li> </ul>
<b>LNH&amp;MC MANAGEMENT</b>
<ul style="list-style-type: none"> <li>• Professor Karimullah Makki, Principal LNH&amp;MC</li> <li>• Dr. Shaheena Akbani, Director A.A &amp; R.T LNH&amp;MC</li> </ul>
<b>STUDY GUIDE COMPILED BY:</b> Department of Health Professions Education

## **INTRODUCTION**

### **WHAT IS A STUDY GUIDE?**

It is an aid to:

- Inform students how student learning program of the module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules and regulations

### **THE STUDY GUIDE:**

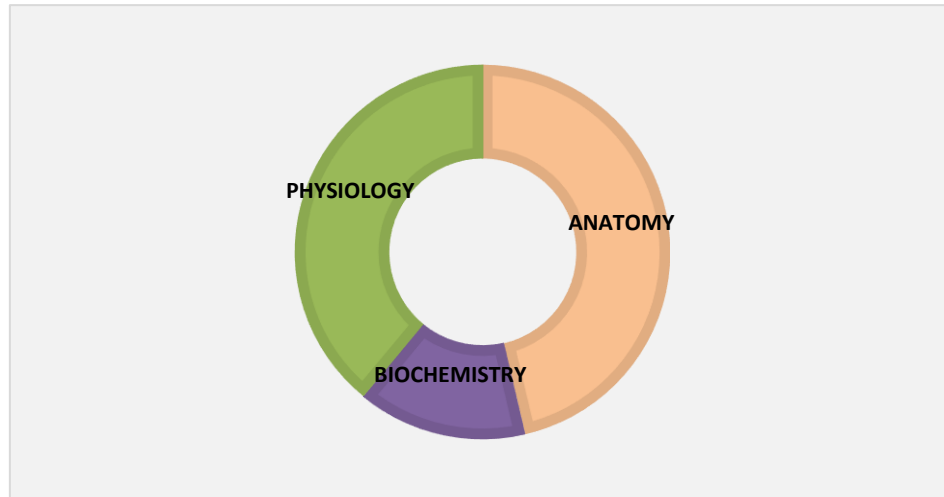
- Communicates information on organization and management of the module. This will help the student to contact the right person in case of any difficulty
- Defines the objectives which are expected to be achieved at the end of the module
- Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives
- Provides a list of learning resources such as books, computer assisted learning programs, web- links, journals, for students to consult in order to maximize their learning
- Highlights information on the contribution of continuous and semester examinations on the student's overall performance
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives
- Focuses on information pertaining to examination policy, rules and regulations

### **CURRICULUM FRAMEWORK**

Students will experience integrated curriculum.

**INTEGRATED CURRICULUM** comprises of system-based modules such as Locomotor system, Respiratory System and Cardiovascular system which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case-based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab and physiotherapy department are characteristics of integrated teaching program.

## **INTEGRATING DISCIPLINES OF RESPIRATORY SYSTEM-I MODULE**



### **LEARNING METHODOLOGIES**

The following teaching / learning methods are used to promote better understanding:

- Interactive Lectures
- Small Group Discussion
- Case- Based Learning (CBL)
- Practicals
- Skills session
- Flipped Classroom
- Self-Directed Learning
- E-Learning

### **INTERACTIVE LECTURES**

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

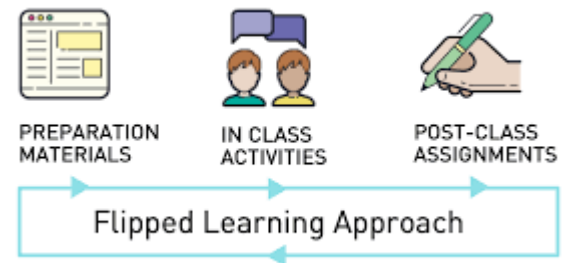
**SMALL GROUP DISCUSSION:** This format helps students to clarify concepts acquire skills or attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics. Students exchange opinions and apply knowledge gained from lectures, tutorials and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

**CASE- BASED LEARNING:** A small group discussion format where learning is focused around a series of questions based on a clinical scenario. Students' discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the module.

**PRACTICAL:** Basic science practicals related to anatomy, biochemistry, pathology, pharmacology and physiology are scheduled for student learning.

**SKILLS SESSION:** Skills relevant to respective module are observed and practiced where applicable in skills laboratory.

**FLIPPED CLASSROOM:** A flipped classroom is a **type of blended learning** where students are introduced to content at home and practice working through it at classroom. This is the reverse of the more common practice of introducing new content classrooms, then assigning homework and projects to completed by the students independently at home.



The concept behind the flipped classroom is to rethink when students have access to the resources they need most. If the problem is that students need help doing the work rather than being introduced to the new thinking behind the work, then the solution the flipped classroom takes is to reverse that pattern

**SELF DIRECTED LEARNING:** Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Center, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-directed Learning.

**E-LEARNING:** E-Learning is a strategy by which learning occurs through the utilization of electronic media, typically the Internet. The basic aspects of medical professionalism and ethics will be addressed through an e-learning course.

## **MODULE: RESPIRATORY SYSTEM-I**

### **IMPORTANCE OF RESPIRATORY SYSTEM**

The module focuses on integrating basic health sciences to clinical medicine. It will be taught in a combination of lectures, tutorials, small group learning sessions, practical and skills classes and possibly visits to clinics / wards. The module will explore the normal as well as the abnormal physiology of the respiratory system. Students will be introduced to a variety of pathologies to facilitate a better understanding of how the respiratory system is impacted by disease. It will give the broad overview of the system. The module will also address respiratory adaptations to exercise as well as examining its responses to different environments like high altitudes and deep sea diving. This will extend students' integrative abilities.

### **AIMS OF THIS MODULE:**

The module aims to provide:

- Knowledge and understanding of the structures and functions of the respiratory system and how it responds to changing metabolic needs of the body, organs and tissues, revealing the relevance of such knowledge to clinical practice
- Knowledge and understanding of the origin and associated risk factors of common diseases of the respiratory system
- Knowledge and prevention of common infectious diseases associated with the respiratory diseases
- Practice of basic skills used in testing the function of this system in a simulated clinical setting



**COURSE OBJECTIVES AND TEACHING STRATEGIES**

At the end of the module the students will be able to:

***ANATOMY***

OBJECTIVES	LEARNING STRATEGY
<b>1. Introduction to thoracic cage, thoracic inlet, and gross anatomy of diaphragm</b>	Interactive Lecture/ Case-Based Learning/ Tutorial
• Describe the thoracic cage and its boundaries	
• Describe thoracic Inlet and thoracic outlet	
• Discuss intercostal muscles and their neuro-vasculature	
• Describe supra-pleural membrane and endo-thoracic fascia	
• Describe the position & component of muscular & tendinous part of diaphragm	
• Describe the attachments of diaphragm	
• Describe the blood supply and nerve supply of diaphragm	
• Describe the opening present in the diaphragm and their respective levels	
• Enumerate the structures passing through the openings and piercing the diaphragm	
• List the functions of diaphragm	
<b>2. Thoracic vertebrae &amp; joints of thoracic wall</b>	Tutorial
• Describe general features of vertebral column	
• Describe spinal curvature in children and adults	
• Discuss general characteristics of a vertebra and general features of thoracic vertebrae	
• Differentiate typical and atypical vertebrae	
• Discuss joints formed by thoracic vertebrae, general features of intervertebral joints, and costovertebral joints	
• Enumerate the diseases related to vertebral column (scoliosis, lordosis, disc prolapse)	
• Describe the features of diseases related to thoracic vertebrae	
<b>3. Thoracic wall muscles &amp; fascia of thoracic wall &amp; movements</b>	Interactive Lecture
• Describe the layers of thoracic wall	
• Describe the attachment of muscles of thoracic wall, their actions & nerve supply	
• Describe the arrangement & modifications of fascia	
<b>4. Neurovascular supply of thoracic wall</b>	Interactive Lecture/ Tutorial
• Describe the nerve supply of skin, fascia and muscles of thoracic wall	
• Describe the origin and course of arteries, and nerves supplying the thoracic wall	
• Explain the venous drainage of thoracic wall, and its communications	
<b>5. Mediastinum, its divisions and contents of superior and anterior mediastinum</b>	Interactive Lecture/ Tutorial
• Define mediastinum	
• Describe the divisions of mediastinum	
• Define the extent and boundaries of mediastinum	
• Describe the boundaries of superior mediastinum	
• List the contents of superior mediastinum	



<ul style="list-style-type: none"> <li>Describe origin, extent and termination of aorta</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the extent, branches and relations of Aorta within the superior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the tributaries of superior vena cava within the superior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the nerves present in the superior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the major viscera present in superior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the boundaries and contents of anterior mediastinum</li> </ul>		
<b>6. Posterior Mediastinum-I (Thoracic Aorta, Esophagus &amp; Azygous System of vein)</b>		
<ul style="list-style-type: none"> <li>Describe the boundaries of posterior mediastinum</li> </ul>	Interactive Lecture	
<ul style="list-style-type: none"> <li>List the contents of posterior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the extent and position of thoracic aorta in posterior mediastinum</li> </ul>		
<ul style="list-style-type: none"> <li>Enumerate the branches of thoracic aorta</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the length, extent and relations of esophagus</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the blood supply, nerve supply, venous drainage, &amp; lymphatics of esophagus</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the clinical significance of anatomical constrictions of esophagus</li> </ul>		
<ul style="list-style-type: none"> <li>Define Azygos system of veins</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the formation, course, relations and tributaries of azygos, Hemi-azygos &amp; Accessory hemi-azygos veins</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss variations in the origin of azygos vein</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the clinical importance of Azygos system of veins</li> </ul>		
<b>7. Posterior mediastinum-II (Thoracic sympathetic trunk, thoracic duct, phrenic and vagus nerve)</b>		
<ul style="list-style-type: none"> <li>Discuss the thoracic part of sympathetic chain, ganglia, and branches</li> </ul>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Describe the origin, intrathoracic course and branches of vagus &amp; phrenic nerves</li> </ul>		
<ul style="list-style-type: none"> <li>Describe origin, extent, tributaries, territory of drainage &amp; termination of thoracic duct</li> </ul>		
<b>8. Introduction to respiratory tract (Gross anatomy of pleura and lung)</b>		
<ul style="list-style-type: none"> <li>Enumerate the parts of respiratory tract</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the clinical (upper and lower respiratory tract) and anatomical (Conducting and respiratory) divisions of respiratory tracts</li> </ul>		
<ul style="list-style-type: none"> <li>Describe parietal and visceral pleura and its innervation</li> </ul>		
<ul style="list-style-type: none"> <li>Describe arrangement of pleura according to lines of orientation (mid sternal, mid clavicular and axillary etc)</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss clinical anatomy of pleura (related to effusion and pleural tap etc)</li> </ul>		
<ul style="list-style-type: none"> <li>Name the diseases related to pleura</li> </ul>		
<ul style="list-style-type: none"> <li>Summarize the features of diseases related to pleura</li> </ul>		
<b>9. Vasculature of lungs, bronchial &amp; pulmonary vessels, &amp; lymphatics of thorax</b>		
<ul style="list-style-type: none"> <li>Describe the origin, course and termination of bronchial vessels and their territory of supply/ drainage</li> </ul>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Discuss the origin, course and termination of pulmonary vessels and their functions</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the nerve supply of lung</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the different groups of lymph nodes in thorax</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the deep as well as the superficial lymphatics of thorax</li> </ul>		
<ul style="list-style-type: none"> <li>Discuss the significance of lymphatics drainage of thorax</li> </ul>		
<b>10. Histology of respiratory epithelium and its variations</b>		
<ul style="list-style-type: none"> <li>Name the types of epithelia lining the various parts of respiratory system</li> </ul>		
<ul style="list-style-type: none"> <li>Explain the histological features of various parts of respiratory system</li> </ul>		

<b>11. Histology of trachea and lung</b>	
• Describe the histological features of different layers of trachea	
• Describe the divisions of bronchial tree	
• Discuss the structural variations in different parts of bronchial tree	
• Describe the structure of alveoli and interalveolar septum	
• Relate the functions of different type of cells, forming the alveolar wall	
• Describe the structure and function of blood -air barrier	
<b>12. Development of body cavities and diaphragm, and their anomalies</b>	
• Define the intra-embryonic mesoderm and its parts	
• Discuss the divisions of lateral plate mesoderm into visceral and parietal layers enclosing intraembryonic coelom	
• Describe the Cephalo-caudal and transverse folding of embryonic disc	
• Specify the extent of intraembryonic coelom after folding and its divisions into three serous cavities	
• Discuss the formation of Pleuro-pericardial and Pleuro-peritoneal membranes	
• Define embryonic components of diaphragm (Septum Trans-versum etc)	
• Discuss the steps of development of diaphragm from its composite embryonic derivatives	
• Discuss anomalies related to its development	
<b>13. Development of respiratory system and its anomalies</b>	
• Discuss the formation of Laryngo- tracheal groove & respiratory diverticulum or Lung Bud	
• Describe the branching of primitive bronchi	
• Discuss the stages of development / maturation of Lungs	
• Name the congenital anomalies of respiratory system (tracheoesophageal fistula etc)	
• Describe the main features of the common congenital anomalies	
<b>14. Cross sectional anatomy of thorax</b>	
• Explain Thorax cross sectional anatomy	
• Identify mediastinal great vessels, organs and lymph nodes on cross sectional images at different levels	
• Identify the structures at T4 vertebral level or angle of Louis	
<b>15. Sternum &amp; Ribs [muscle attachment, typical and atypical ribs] (Demonstration)</b>	
• Describe the borders and surfaces of sternum	
• Summarize the locations of the muscles attached on sternum	
• Enumerate the type of joints formed at sternum	
• Relate the type of joint with its functions (clinical significance)	
• Classify ribs	
• Discuss the features of ribs	
• Differentiate typical from atypical ribs	
• Describe the attachments (muscles and ligaments) on ribs	
• Discuss joints formed by the ribs	
• Describe the clinical features of cervical rib and rib fracture	
• Describe the functional significance of sternum	
<b>16. Gross anatomy of lung (Demonstration)</b>	
• Describe apex, base, surfaces and borders of lungs	
• Describe Hilum /root of the lungs	
	Tutorial

• Discuss Fissures and lobes of the lungs	
• Describe the divisions of bronchial tree	
• Describe the bronchopulmonary segmentation and their importance	
<b>17. Surface anatomy of thoracic wall, lungs &amp; pleura (Demonstration)</b>	
• Describe surface marking of ribs and intercostal spaces	
• Mark the anatomical landmarks of important thoracic arteries and veins	
• Identify the surface anatomy of trachea and main bronchi	
• Identify the important anatomical landmarks of lungs	
• Mark the surface anatomy of pleura	
<b>18. Respiratory epithelium and its variations</b>	
• Identify the various epithelial tissue and its variations in different parts of conducting system, as shown in the slides of respiratory tract	
<b>19. Histology of trachea and lung</b>	
• Describe the histological characteristics of different layers of trachea based on light microscope findings	
• Identify different components of bronchial tree	
• Identify alveolar duct, alveolar sac and alveoli	

## **BIOCHEMISTRY**

OBJECTIVES	LEARNING STRATEGY
<b>1. Phospholipids</b>	Interactive Lecture/ Tutorial
• Classify the Phospholipids in the human body with examples	
• Discuss the synthesis and degradation of phospholipids	
• Discuss the functions of phospholipids in the human body	
• Describe the synthesis and biochemical role of surfactant	
• Discuss the clinical significance of Acute Respiratory Distress Syndrome	
<b>2. Regulation of acid base balance</b>	Interactive Lecture
• Explain the mechanism of acid production	
• List the volatile & non-volatile acids	
• Describe the Henderson's Hassellbach equation	
• Explain the mechanisms of buffer in human body	
• Discuss the normal regulation of pH by buffers, respiratory and renal systems	
• Explain the anion gap and its biochemical significance	
• Interpret the values of Arterial Blood Gases (ABGs)	
<b>3. Respiratory pH disturbances</b>	
• Explain the role of respiration in pH regulation	
• Explain the mechanism of pH regulations in respiratory disturbances	
• Explain how to analyze ABGs in respiratory disorders	
• Discuss the clinical disorder of respiratory pH disturbances and their ABGs	

<b>4. Respiratory compensation mechanism</b>	
• Describe the compensation of pH disturbances by the respiratory system	
• Describe compensation of pH disturbances due to respiratory diseases	
• Describe respiratory acidosis and respiratory alkalosis	
• Interpret the respective ABGs in various clinical disorders	
<b>5. Arterial Blood Gases (ABGs)</b>	
• Interpret the normal values of Arterial Blood Gases (ABGs)	Tutorial
• Interpret the ABGs in various clinical disorders	
• Discuss the ABGs in compensated Acid based Disorders	
<b>6. pH meter</b>	
• Identify the chemical tests and bio-techniques to detect pH of solutions	Practical
• Outline the methods for detection of pH of solutions in a sample	
• Determine the pH of different solutions using pH meter and litmus paper	
• Correlate the laboratory investigations with relevant clinical conditions	

## PHYSIOLOGY

OBJECTIVES	LEARNING STRATEGY
<b>1. Introduction to Respiratory Physiology</b>	Interactive Lecture
• List parts of upper and lower respiratory tract	
• Describe the functions of respiratory passages	
<b>2. Mechanics of Respiration</b>	
• Explain mechanism of pulmonary ventilation with reference to thoracic cage & muscles of respiration	
• Define alveolar pressure, pleural pressure, and alveolar ventilation	
• Discuss trans-pulmonary pressure and its changes during respiration	
• Define dead space	
<b>3. Lung Compliance</b>	
• Define lung compliance	
• List factors affecting lung compliance	
• Describe the role of surfactant in maintaining lung compliance	
• Differentiate compliance work, tissue resistance work & airway resistance work	
<b>4. Pulmonary volumes and capacities</b>	
• List the pulmonary volumes & capacity with their normal values & significance in pulmonary function test	
• Determine functional residual capacity, residual vol. & total lung capacity (helium dilution method)	
<b>5. Pulmonary circulation V/Q relationship</b>	Interactive Lecture/ Tutorial/ Self Directed Learning
• Describe pressure in pulmonary circulation & blood flow zones of lung (1,2,3)	
• Explain pulmonary capillary dynamics	
• Explain mechanism of development of pulmonary edema	
• State the importance of ventilation/perfusion ratio	

<b>6. Diffusion of gases</b>		
<ul style="list-style-type: none"> <li>Define respiration unit &amp; respiration membrane</li> </ul>	Interactive Lecture/ Tutorial	
<ul style="list-style-type: none"> <li>Describe mechanics of diffusion across respiration membrane &amp; factors effecting diffusion</li> </ul>		
<ul style="list-style-type: none"> <li>List partial pressure of respiratory gases in atmosphere, humidified, alveolar &amp; expired air</li> </ul>		
<ul style="list-style-type: none"> <li>Describe briefly the diffusing capacity of O<sub>2</sub> and CO<sub>2</sub></li> </ul>		
<b>7. Transport of Carbon dioxide (CO<sub>2</sub>)</b>		
<ul style="list-style-type: none"> <li>Describe the chloride shift</li> </ul>	Interactive Lecture	
<ul style="list-style-type: none"> <li>Relate effect of CO<sub>2</sub> and O<sub>2</sub> transport (Haldane effect)</li> </ul>		
<ul style="list-style-type: none"> <li>Define respiratory exchange ratio</li> </ul>		
<b>8. Oxygen (O<sub>2</sub>) transport and O<sub>2</sub>-Hb curve</b>		
<ul style="list-style-type: none"> <li>Explain transport of O<sub>2</sub> from lungs to body tissues</li> </ul>	Interactive Lecture/ Flipped Classroom	
<ul style="list-style-type: none"> <li>Describe briefly the role of Hb in O<sub>2</sub> transport</li> </ul>		
<ul style="list-style-type: none"> <li>Define Bohr effect</li> </ul>		
<b>9. Respiratory adjustments to exercise</b>		
<ul style="list-style-type: none"> <li>Describe the effects of exercise on respiratory system</li> </ul>	Interactive Lecture	
<b>10. Respiratory adjustments to high altitude &amp; deep sea</b>		
<ul style="list-style-type: none"> <li>Explain physiology of acclimatization and deep sea diving</li> </ul>		
<b>11. Hypoxia and its types</b>		
<ul style="list-style-type: none"> <li>Define hypoxia and its types</li> </ul>		
<ul style="list-style-type: none"> <li>Describe coughing &amp; sneezing reflexes</li> </ul>		
<b>12. Regulation of respiration</b>		
<ul style="list-style-type: none"> <li>List the respiratory centers &amp; their effect on the regulation of respiration</li> </ul>		
<ul style="list-style-type: none"> <li>Describe the neural and chemical control of respiration</li> </ul>		
<b>13. Pulmonary causes of Dyspnea</b>		
<ul style="list-style-type: none"> <li>Describe the Pulmonary causes of Dyspnea: Emphysema, Pneumonia, Atelectasis and Tuberculosis</li> </ul>		
<b>14. Introduction to Power Lab</b>		
<ul style="list-style-type: none"> <li>Identify different parts of power lab with respect to respiration and recording of normal respiratory rate</li> </ul>	Practical	
<b>15. Lung volume and capacities</b>		
<ul style="list-style-type: none"> <li>Determine lung volumes and capacities (Spirogram)</li> </ul>		
<b>16. Pulmonary Function Tests (spirometry)</b>		
<ul style="list-style-type: none"> <li>Perform respiratory function tests</li> </ul>		
<ul style="list-style-type: none"> <li>Interpret results of respiratory function tests</li> </ul>		

**LEARNING RESOURCES**

<b>SUBJECT</b>	<b>RESOURCES</b>
<b>ANATOMY</b>	<p><b>A. <u>GROSS ANATOMY</u></b></p> <ol style="list-style-type: none"> <li>1. K.L. Moore, Clinically Oriented Anatomy</li> <li>2. Neuro Anatomy by Richard Snell</li> </ol> <p><b>B. <u>HISTOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather’s Functional Histology</li> </ol> <p><b>C. <u>EMBRYOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human</li> <li>2. Langman’s Medical Embryology</li> </ol>
<b>BIOCHEMISTRY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Harper’s Illustrated Biochemistry</li> <li>2. Lehninger Principle of Biochemistry</li> <li>3. Biochemistry by Devlin</li> </ol>
<b>PHYSIOLOGY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall</li> <li>2. Ganong ‘ S Review of Medical Physiology</li> <li>3. Human Physiology by Lauralee Sherwood</li> <li>4. Berne &amp; Levy Physiology</li> <li>5. Best &amp; Taylor Physiological Basis of Medical Practice</li> </ol> <p><b>B. <u>REFERENCE BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Guyton &amp; Hall Physiological Review</li> <li>2. Essentials Of Medical Physiology by Jaypee</li> <li>3. Textbook Of Medical Physiology by InduKhurana</li> <li>4. Short Textbook Of Physiology by Mrthur</li> <li>5. NMS Physiology</li> </ol>

**ASSESSMENT METHODS:**

- **Best Choice Questions(BCQs)** also known as MCQs (Multiple Choice Questions)
- **Objective Structured Practical/Clinical Examination (OSPE or OSCE)**

**Internal Evaluation**

- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% may include class tests, assignment, practicals and the internal exam which will all have specific marks allocation.

**Formative Assessment**

Individual department may hold quiz or short answer questions to help students assess their own learning. The marks obtained are not included in the internal evaluation

**For JSMU Examination Policy, please consult JSMU website!**

**More than 75% attendance is needed to sit for the internal and final examinations**



**LNH&MC EXAMINATION RULES & REGULATIONS**

- Student must report to examination hall/venue, 30 minutes before the exam.
- **Exam will begin sharp at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in examination hall.**
- If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
- No students will be allowed to sit in exam without University Admit Card, LNMC College ID Card and Lab Coat
- Student must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
- Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students



**SCHEDULE:**

WEEKS	1 <sup>ST</sup> YEAR	MONTH
WEEK 1	RESPIRATORY MODULE	1 <sup>st</sup> Aug 2022
WEEK 2		
WEEK 3		
WEEK 4		25 <sup>th</sup> Aug 2022
WEEK 1	CVS MODULE	29 <sup>th</sup> Aug 2022
WEEK 2		
WEEK 3		
WEEK 4		Oct 2022*
<b>PRE PROF EXAM*</b>		

\*Final dates will be announced later