

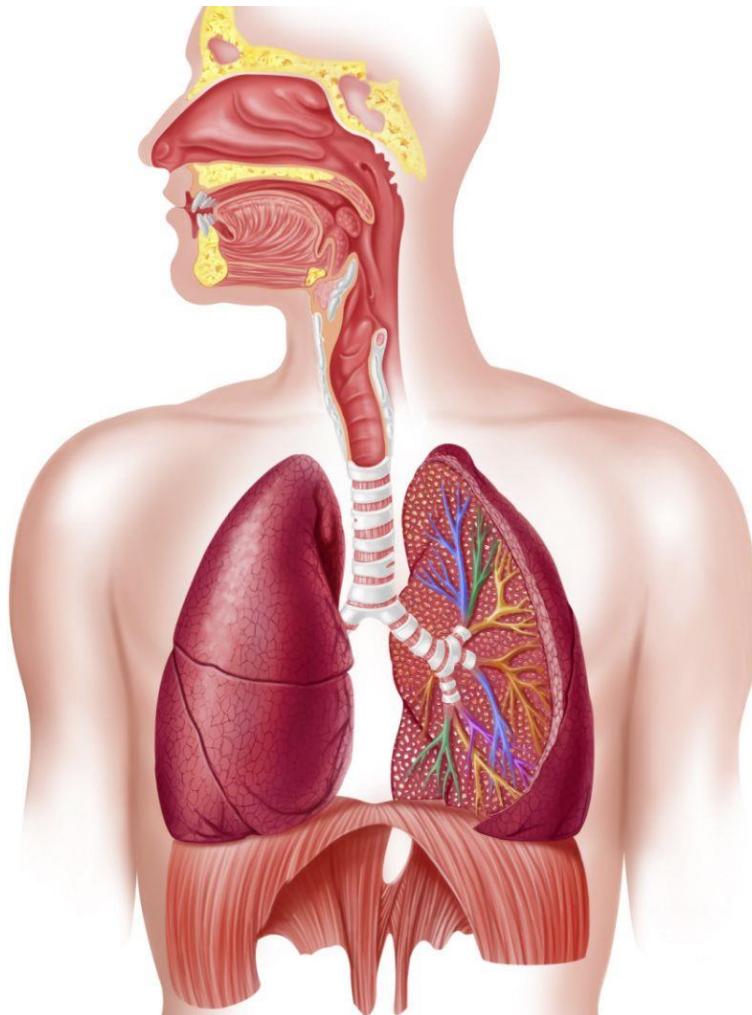
 **LIAQUAT NATIONAL HOSPITAL AND MEDICAL COLLEGE**



Institute for Postgraduate Medical Studies & Health Science

## ***RESPIRATORY MODULE I***

***17<sup>th</sup> August to 16<sup>th</sup> September 2026***



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

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Module name: Respiratory System I

Year: one

Duration: 5 weeks (Aug – Sept 2026)

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

## MODULE INTEGRATED COMMITTEE

|                           |                                              |
|---------------------------|----------------------------------------------|
| <b>MODULE COORDINATOR</b> | <b>Dr. Naila Perveen (Physiology)</b>        |
| <b>CO-COORDINATOR</b>     | <b>Dr. Nimra Akhtar (Community Medicine)</b> |

## DEPARTMENTS &amp; RESOURCE PERSONS' FACILITATING LEARNING

| BASIC HEALTH SCIENCES                                                                                                                                                                           |                                 |                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------|
| <b>ANATOMY</b><br>Prof. Zia-ul-Islam                                                                                                                                                            |                                 |                                         |
| <b>BIOCHEMISTRY</b><br>Prof. Faiza Waseem                                                                                                                                                       |                                 |                                         |
| <b>PHYSIOLOGY</b><br>Prof. Syed Hafeezul Hassan                                                                                                                                                 |                                 |                                         |
| <b>DEPARTMENT of HEALTH PROFESSIONS EDUCATION</b>                                                                                                                                               |                                 |                                         |
| Prof. Nighat Huda<br>Dr. Yusra Nasir                                                                                                                                                            | Prof. Sobia Ali<br>Dr. Asra Zia | Dr. Afifa Tabassum<br>Dr. Maryam Fatima |
| <b>LNH&amp;MC MANAGEMENT</b> <ul style="list-style-type: none"> <li>• Prof. 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: Department of Health Professions Education</b>                                                                                                                      |                                 |                                         |

**INTRODUCTION****WHAT IS A STUDY GUIDE?**

It is an aid to:

Inform students how the 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 the 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 Interactive Lectures, small group teachings, clinical skills, demonstrations, tutorials, 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, and journals, for students to consult to maximize their learning.
- Highlights information on continuous and module examinations' contribution to 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 about examination policy, rules, and regulations.

**CURRICULUM FRAMEWORK**

Students will experience an integrated curriculum similar to previous modules.

**INTEGRATED CURRICULUM** comprises system-based modules such as Foundation II, Blood II, Locomotor II, Respiratory system-II, CVS-II, and GIT Liver II, linking basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have a better understanding of basic sciences when they repeatedly learn about clinical examples.

**LEARNING EXPERIENCES:** Case-based integrated discussions, and skills acquisition in the skills lab. Computer-based assignments, and learning experiences in clinics, wards, and outreach centers.

**LEARNING METHODOLOGIES**

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

- Interactive Lectures
- Tutorial
- Case- Based Learning (CBL)
- Skills session
- Self-Directed Learning

**INTERACTIVE LECTURES:**

In a large group, the Interactive Lectures introduce a topic or common clinical conditions and explain the underlying phenomena through questions, pictures, videos of patient interviews, exercises, etc. Students are actively involved in the learning process

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

**CASE-BASED LEARNING (CBL):** A small group discussion format where learning is focused on a series of questions based on a clinical scenario. Students discuss and answer the questions by applying relevant knowledge gained previously in clinical and basic health sciences during the module and constructing new knowledge. The CBL will be provided by the concerned department.

**Community Medicine Experiences.** Here students observe patients, take histories and perform supervised clinical examinations in outpatient and inpatient settings. They also get an opportunity to observe medical personnel working as a team. These rotations help students relate basic medical and clinical knowledge in diverse clinical areas.

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

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

**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 the diaphragm</b>                            | Interactive Lecture |
| • Describe the thoracic cage and its boundaries                                                                        |                     |
| • Describe the 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 the diaphragm                                                                            |                     |
| • Describe the blood supply and nerve supply of the 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 the diaphragm                                                                                  |                     |
| <b>2. Thoracic vertebrae &amp; joints of the thoracic wall</b>                                                         | Tutorial            |
| • Describe the general features of the vertebral column                                                                |                     |
| • Describe spinal curvature in children and adults                                                                     |                     |
| • Discuss the 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 cost of vertebral joints |                     |
| • Enumerate the diseases related to the 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 the thoracic wall                                                                             |                     |
| • Describe the attachment of muscles of the thoracic wall, their actions & nerve supply                                |                     |
| • Describe the arrangement & modifications of fascia                                                                   |                     |
| <b>4. Neurovascular supply of thoracic wall</b>                                                                        |                     |
| • Describe the nerve supply of skin, fascia, and muscles of the thoracic wall                                          | Interactive Lecture |
| • Describe the origin and course of arteries, and nerves supplying the thoracic wall                                   |                     |
| • Explain the venous drainage of the thoracic wall and its communications                                              |                     |
| <b>5. Mediastinum, its divisions, and contents of the superior and anterior mediastinum</b>                            |                     |
| • Define mediastinum                                                                                                   |                     |
| • Describe the divisions of the mediastinum                                                                            | Interactive Lecture |
| • Define the extent and boundaries of the mediastinum                                                                  |                     |
| • Describe the boundaries of the superior mediastinum                                                                  |                     |
| • List the contents of the superior mediastinum                                                                        |                     |

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

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| <b>11. Histology of trachea and lung</b> <ul style="list-style-type: none"> <li>Describe the histological features of different layers of the trachea</li> <li>Describe the divisions of the bronchial tree</li> <li>Discuss the structural variations in different parts of the bronchial tree</li> <li>Describe the structure of alveoli and interalveolar septum</li> <li>Relate the functions of different types of cells, forming the alveolar wall</li> <li>Describe the structure and function of the blood –the air barrier</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |
| <b>12. Development of body cavities and diaphragm, and their anomalies</b> <ul style="list-style-type: none"> <li>Define the intra-embryonic mesoderm and its parts</li> <li>Discuss the divisions of lateral plate mesoderm into visceral and parietal layers enclosing intraembryonic coelom</li> <li>Describe the Cephalo-caudal and transverse folding of the embryonic disc</li> <li>Specify the extent of intraembryonic coelom after folding and its divisions into three serous cavities</li> <li>Discuss the formation of Pleuro-pericardial and Pleuro-peritoneal membranes</li> <li>Define embryonic components of the diaphragm (Septum Trans-verse etc)</li> <li>Discuss the steps of development of the diaphragm from its composite embryonic derivatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |
| <b>13. Development of the respiratory system and its anomalies</b> <ul style="list-style-type: none"> <li>Discuss the formation of Laryngo- the tracheal groove &amp; respiratory diverticulum or Lung Bud</li> <li>Describe the branching of primitive bronchi</li> <li>Discuss the stages of development/maturation of Lungs</li> <li>Name the congenital anomalies of the respiratory system (tracheoesophageal fistula etc)</li> <li>Describe the main features of the common congenital anomalies</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |
| <b>14. Cross-sectional anatomy of the thorax</b> <ul style="list-style-type: none"> <li>Explain Thorax cross-sectional anatomy</li> <li>Identify mediastinal great vessels, organs, and lymph nodes on cross-sectional images at different levels</li> <li>Identify the structures at the T4 vertebral level or angle of Louis</li> </ul> <b>15. Sternum &amp; Ribs [muscle attachment, typical and atypical ribs] (Demonstration)</b> <ul style="list-style-type: none"> <li>Describe the borders and surfaces of the sternum</li> <li>Summarize the locations of the muscles attached to the sternum</li> <li>Enumerate the type of joints formed at the sternum</li> <li>Relate the type of joint with its functions (clinical significance)</li> <li>Classify ribs</li> <li>Discuss the features of ribs</li> <li>Differentiate typical from atypical ribs</li> <li>Describe the attachments (muscles and ligaments) on ribs</li> <li>Discuss joints formed by the ribs</li> <li>Describe the clinical features of cervical rib and rib fracture</li> <li>Describe the functional significance of the sternum</li> </ul> <b>16. Gross anatomy of the lung (Demonstration)</b> <ul style="list-style-type: none"> <li>Describe the apex, base, surfaces, and borders of the lungs</li> <li>Describe Hilum /root of the lungs</li> </ul> | Tutorial |

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| <ul style="list-style-type: none"> <li>• Discuss Fissures and lobes of the lungs</li> <li>• Describe the divisions of the bronchial tree</li> <li>• Describe the Broncho pulmonary segmentation and their importance</li> </ul>                                                                                                                                                                 |           |
| <b>17. Surface anatomy of thoracic wall, lungs &amp; pleura (Demonstration)</b>                                                                                                                                                                                                                                                                                                                 |           |
| <ul style="list-style-type: none"> <li>• Describe the surface marking of ribs and intercostal spaces</li> <li>• Mark the anatomical landmarks of important thoracic arteries and veins</li> <li>• Identify the surface anatomy of the trachea and main bronchi</li> <li>• Identify the important anatomical landmarks of the lungs</li> <li>• Mark the surface anatomy of the pleura</li> </ul> |           |
| <b>18. Respiratory epithelium and its variations</b>                                                                                                                                                                                                                                                                                                                                            |           |
| <ul style="list-style-type: none"> <li>• Identify the various epithelial tissue and its variations in different parts of conducting system, as shown in the slides of the respiratory tract</li> </ul>                                                                                                                                                                                          |           |
| <b>19. Histology of trachea and lung</b>                                                                                                                                                                                                                                                                                                                                                        |           |
| <ul style="list-style-type: none"> <li>• Describe the histological characteristics of different layers of the trachea based on light microscope findings</li> <li>• Identify different components of the bronchial tree</li> <li>• Identify alveolar duct, alveolar sac and alveoli</li> </ul>                                                                                                  |           |
|                                                                                                                                                                                                                                                                                                                                                                                                 | Practical |

## BIOCHEMISTRY

| OBJECTIVES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | LEARNING STRATEGY             |
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| <b>1. Phospholipids</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Interactive Lecture/ Tutorial |
| <ul style="list-style-type: none"> <li>• Classify the Phospholipids in the human body with examples</li> <li>• Discuss the synthesis and degradation of phospholipids</li> <li>• Discuss the functions of phospholipids in the human body</li> <li>• Describe the synthesis and biochemical role of surfactant</li> <li>• Discuss the clinical significance of Acute Respiratory Distress Syndrome</li> </ul>                                                                                   |                               |
| <b>2. Regulation acid-base balance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |
| <ul style="list-style-type: none"> <li>• Explain the mechanism of acid production</li> <li>• List the volatile &amp; non-volatile acids</li> <li>• Describe Henderson's Hassellbach equation</li> <li>• Explain the mechanisms of buffer in the human body</li> <li>• Discuss the normal regulation of pH by buffers, respiratory and renal systems</li> <li>• Explain the anion gap and its biochemical significance</li> <li>• Interpret the values of Arterial Blood Gases (ABGs)</li> </ul> |                               |
| <b>3. Respiratory pH disturbances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |
| <ul style="list-style-type: none"> <li>• Explain the role of respiration in pH regulation</li> <li>• Explain the mechanism of pH regulations in respiratory disturbances</li> <li>• Explain how to analyze ABGs in respiratory disorders</li> <li>• Discuss the clinical disorder of respiratory pH disturbances and their ABGs</li> </ul>                                                                                                                                                      | Interactive Lecture/SDL       |

|                                                                                |  |           |
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| <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>                                          |  | Tutorial  |
| • Interpret the normal values of Arterial Blood Gases (ABGs)                   |  |           |
| • Interpret the ABGs in various clinical disorders                             |  |           |
| • Discuss the ABGs in compensated Acid based Disorders                         |  |           |
| <b>6. pH meter</b>                                                             |  | Practical |
| • Identify the chemical tests and bio-techniques to detect the pH of solutions |  |           |
| • Outline the methods for the detection of the pH of solutions in a sample     |  |           |
| • Determine the pH of different solutions using a 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 the upper and lower respiratory tract                                                      |                     |
| • Describe the functions of respiratory passages                                                           |                     |
| <b>2. Mechanics of Respiration</b>                                                                         |                     |
| • Explain the mechanism of pulmonary ventilation concerning the 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 |
| • Describe pressure in pulmonary circulation & blood flow zones of lung (1,2,3)                            |                     |
| • Explain pulmonary capillary dynamics                                                                     |                     |
| • Explain the mechanism of the development of pulmonary edema                                              |                     |
| • State the importance of the ventilation/perfusion ratio                                                  |                     |

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| <b>6. Diffusion of gases</b>                                                                                                                                |  | Interactive Lecture |
| <ul style="list-style-type: none"><li>• Define respiration unit &amp; respiration membrane</li></ul>                                                        |  |                     |
| <ul style="list-style-type: none"><li>• Describe the mechanics of diffusion across the respiration membrane &amp; facts affecting diffusion</li></ul>       |  |                     |
| <ul style="list-style-type: none"><li>• List partial pressure of respiratory gases in the atmosphere, humidified, alveolar &amp; expired air</li></ul>      |  |                     |
| <ul style="list-style-type: none"><li>• Describe briefly the diffusing capacity of O2 and CO2</li></ul>                                                     |  |                     |
| <b>7. Transport of Carbon dioxide (CO2)</b>                                                                                                                 |  | Interactive Lecture |
| <ul style="list-style-type: none"><li>• Describe the chloride shift</li></ul>                                                                               |  |                     |
| <ul style="list-style-type: none"><li>• Relate effect of CO2 and O2 transport (Haldane effect)</li></ul>                                                    |  |                     |
| <ul style="list-style-type: none"><li>• Define respiratory exchange ratio</li></ul>                                                                         |  |                     |
| <b>8. Oxygen (O2) transport and O2-Hb curve</b>                                                                                                             |  | Interactive Lecture |
| <ul style="list-style-type: none"><li>• Explain the transport of O2 from lungs to body tissues</li></ul>                                                    |  |                     |
| <ul style="list-style-type: none"><li>• Describe briefly the role of Hb in O2 transport</li></ul>                                                           |  |                     |
| <ul style="list-style-type: none"><li>• Define the Bohr effect</li></ul>                                                                                    |  |                     |
| <b>9. Respiratory adjustments to exercise</b>                                                                                                               |  | Interactive Lecture |
| <ul style="list-style-type: none"><li>• Describe the effects of exercise on the respiratory system</li></ul>                                                |  |                     |
| <b>10. Respiratory adjustments to high altitude &amp; deep sea</b>                                                                                          |  |                     |
| <ul style="list-style-type: none"><li>• Explain the 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>                                                                                                                        |  | Practical           |
| <ul style="list-style-type: none"><li>• Identify different parts of the power lab concerning respiration and recording of normal respiratory rate</li></ul> |  |                     |
| <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>                                                           |  |                     |
| <b>17. Obstructive vs Restrictive lung disease with respect to spirometry</b>                                                                               |  | Tutorial            |
| <ul style="list-style-type: none"><li>• Define obstructive lung disease and classify them</li></ul>                                                         |  |                     |
| <ul style="list-style-type: none"><li>• Define restrictive lung disease and classify them</li></ul>                                                         |  |                     |
| <ul style="list-style-type: none"><li>• Differentiate between obstructive and restrictive lung diseases</li></ul>                                           |  |                     |
| <ul style="list-style-type: none"><li>• Discuss the importance of FVC/FEV1 in diagnosis of COPD and restrictive lung disease</li></ul>                      |  |                     |

**LEARNING RESOURCES**

| <b><i>SUBJECT</i></b> | <b><i>RESOURCES</i></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 Indu Khurana</li> <li>4. Short Textbook Of Physiology by Arthur</li> <li>5. NMS Physiology</li> </ol> |

**ASSESSMENT METHODS:**

- MCQs (Multiple Choice Questions)
- **Objective Structured Practical/Clinical Examination (OSPE or OSCE)**
- MCQs and unobserved OSPE will be conducted on the LNH&MC Moodle platform
- Observed OSPE will constitute multiple examiner-based stations

**Internal Evaluation**

- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% includes mid-module & end of module examinations, mid-term & pre-professional examinations.

**Formative Assessment**

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

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

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



**LNMC EXAMINATION RULES & REGULATIONS**

- Students must report to the examination hall/venue, 30 minutes before the exam.
- **The exam will begin sharply at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of the scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in the examination hall.**
- If any student is found with a cell phone in any mode (silent, switched off, or on) he/she will not be allowed to continue their exam.
- No students will be allowed to sit in exams without University Admit Card, LNMC College ID Card, and Lab Coat.
- Students 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 5                                                       | RESPIRATORY MODULE   | 17 <sup>th</sup> Aug 2026 |
|                                                              |                      |                           |
|                                                              |                      | 16 <sup>th</sup> Sep 2026 |
| <ul style="list-style-type: none"><li>• CVS Module</li></ul> |                      |                           |