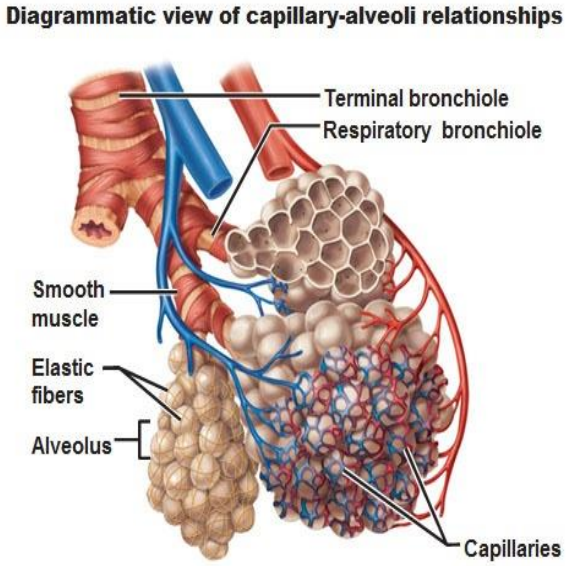
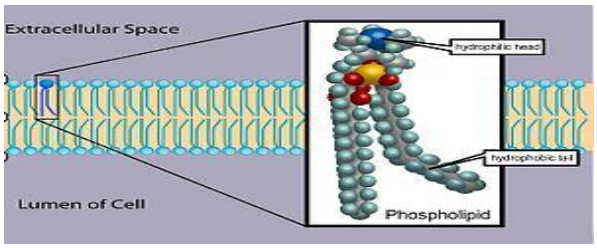
STUDY GUIDE

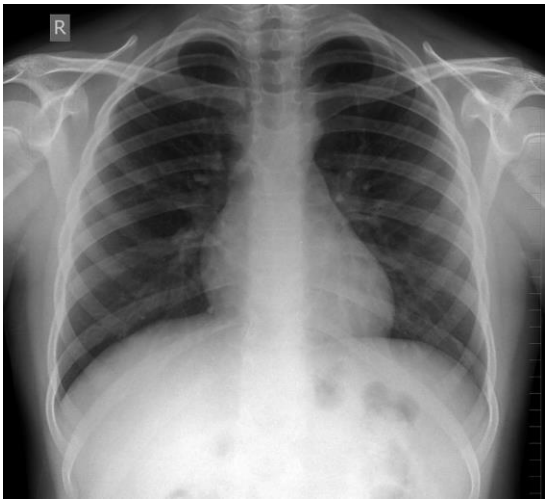
RESPIRATORY SYSTEM-I MODULE

FIRST YEAR MBBS SEMESTER 2

3rd – 27th July 2019







LIAQUAT NATIONAL HOSPITAL & MEDICAL COLLEGE

STUDY GUIDE FOR RESPIRATORY SYSTEM-I MODULE

Module name: **Respiratory system I**

Year: ***one*** *Duration:* ***4 weeks (July 2019)***

Timetable hours: **Lectures, Team based Learning (TBL), Laboratory, Practical, Demonstrations, Skills, Self-Study**

MODULE INTEGRATED COMMITTEE

MODULE COORDINATOR:	• Prof. Syed Hafeez-ul-Hassan
CO-COORDINATOR: ***HPE CO-COORDINATOR:***	• Dr. Sadia Abdul Qayyum • Dr. Afifa Tabassum

DEPARTMENTS & RESOURCE PERSONS

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS
ANATOMY • Professor Zia-ul-Islam	***PULMONOLOGY*** • Dr. Syed Ali Arsalan
BIOCHEMISTRY • Dr. Kashif Nisar	***RADIOLOGY*** • Dr. Misbah Tahir
COMMUNITY MEDICINE • Dr. Saima Zainab	***RESEARCH AND SKILLS DEVELOPMENT CENTER*** • Dr Kahkashan Tahir
PATHOLOGY • Professor Naveen Faridi	
PHARMACOLOGY • Professor Nazir Ahmad Solangi	
PHYSIOLOGY • Professor Syed Hafeezul Hassan	
DEPARTMENT of HEALTHCARE EDUCATION • Professor Nighat Huda • Dr. Sobia Ali • Dr. Afifa Tabassum • Dr. Mehnaz Umair • Dr. Muhammad Suleman	
LNH&MC MANAGEMENT • Professor Karimullah Makki, Principal LNH&MC • Dr. Shaheena Akbani, Director A.A & R.T LNH&MC	
STUDY GUIDE COMPILED BY: Dr. Afifa Tabassum, *Department of Health Care Education*	

INTRODUCTION

WHAT IS A STUDY GUIDE?

It is an aid to:

- Inform students how student learning program of the semester-wise 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:

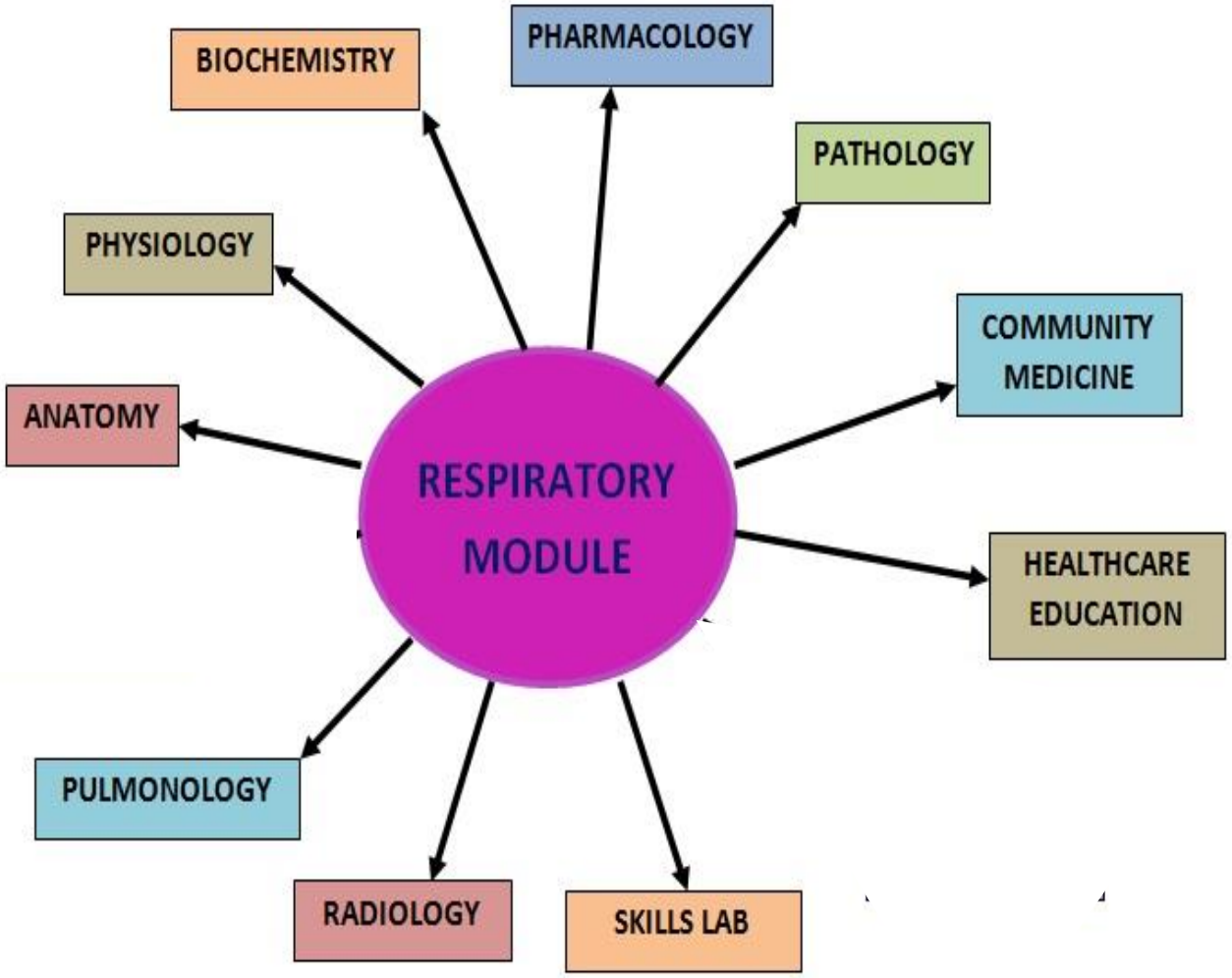
- Communicates information on organization and management of the module
  This will help the student to contact the right person in case of any difficulty
- Defines the objectives which are expected to be achieved at the end of the module
- Identifies the learning strategies such as lectures, small group 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* of 1st & 2nd semesters**.**

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 MODULE



LEARNING METHODOLOGIES

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

Teaching/Learning Technique	Icons
Interactive Lectures	
Hospital / Clinic visits	
Small Group Sessions	
Case- Based Learning	
Practicals / Skills session	
Self Study	

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.

HOSPITAL VISITS: In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

SMALL GROUP SESSION (SGS): 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 or Department of Physiotherapy.

SELF STUDY: 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-study.

MODULE 2: 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

TOPIC	*TEACHING STRATEGY*
STRUCTURE AND FUNCTION OF THORAX, RIBS, THROACIC VERTEBRA, STERNUM, THORACIC CAGE (MUSCLES, JOINTS) & DIAPHRAGM • Define diaphragm • Describe the thoracic cage and its boundaries, thoracic Inlet and outlet • Discuss intercostals muscles and their neurovasculature • Describe suprapleural membrane and endothoracic fascia. • Describe the attachments of diaphragm • Describe the blood supply and nerve supply of diaphragm • Describe the openings present in the diaphragm and their respective levels • List the structures passing through the openings and piercing the diaphragm • List the functions of diaphragm • List diseases caused by phrenic nerve injury • Describe the location, shape, parts and clinical significance of Sternum • Describe general feature of vertebral column • Describe Spinal Curvature in children and adults • Describe general features of thoracic vertebrae • Differentiate typical and atypical vertebrae • Desribe the diseases related to vertebral column (scoliosis, disc prolapse) • Classify ribs • Discuss the features of ribs • Describe the joints and attachments (muscles and ligaments) ribs • Describe the clinical features in conditions of cervical rib and rib fracture **INTRODUCTION TO RESPIRATORY TRACT AND GROSS ANATOMY OF PLEURA AND LUNG** • List the parts of respiratory tract • Describe the clinical (upper and lower respiratory tract) and anatomical (conducting and respiratory) divisions of respiratory tracts	 

- Describe parietal and visceral pleura and its innervation
- Describe arrangement of pleura according to lines of orientation (mid sternal, mid clavicular and axillary etc)
- Describe apex , base surfaces and borders of lungs
- Describe hilum of the lungs
- Discuss fissures and lobes of the lungs
- Describe the divisions of bronchial tree.
- Describe the bronchopulmonary segmentation and their importance
- Name the diseases related to pleura
- Outline the features of diseases related to pleura
- Describe the surface anatomy of lungs

VASCULATURE OF LUNGS,BRONCHIAL AND PULMONARY VESSELS AND LYMPHATICS OF THORAX

- Describe the origin, course and termination of bronchial vessels and their territory of supply / drainage
- Discuss the origin, course and termination of pulmonary vessels and their functions
- Describe the nerve supply of lung
- Describe the different groups of lymph nodes in thorax
- Discuss the deep as well as the superficial lymphatics of thorax
- Discuss the significance of lymphatics drainage of thorax

MEDIASTINUM, ITS DIVISIONS AND CONTENTS OF SUPERIOR AND ANTERIOR MEDIASTINUM

- 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
- Describe origin, extent and termination of aorta
- Describe intrathoracic part of aorta, its branches and relations within in the superior mediastinum
- Describe the tributaries of superior vena cava within superior mediastinum
- Discuss the nerves within superior mediastinum
- Describe the major viscera present in superior mediastinum
- Describe the contents of anterior mediastinum

POSTERIOR MEDIASTINUM AND ITS CONTENTS (THORACIC AORTA AND ESOPHAGUS)

- Describe the boundaries of posterior mediastinum
- List the contents of posterior mediastinum
- Describe the extent and position of thoracic aorta in posterior mediastinum
- Name the branches of thoracic aorta
- Describe the length, extent and relations of esophagus
- Describe the blood supply, nerve supply, venous drainage and lymphatics of esophagus
- Discuss the clinical significance of anatomical constrictions of esophagus

POSTERIOR MEDIASTINUM THORACIC SYMPATHETIC TRUNK, THORACIC DUCT, PHRENIC AND VAGUS NERVE

- Discuss the thoracic part of symphathetic chain, ganglia, and branches
- Describe the origin, intrathoracic course and branches of vagus & phrenic nerves
- Describe origin, extent, tributaries, territory of drainage and termination of thoracic duct

AZYGOS SYSTEM OF VEINS

- Define Azygos system of veins
- Describe the formation, course, relations and tributaries of azygos, hemi-azygos & accessory hemi-azygos veins
- Discuss variations in the origin of azygos vein
- Discuss the clinical importance of azygos system of veins

CROSS SECTIONAL ANATOMY OF THORAX

- Identify mediastinal great vessels, organs and lymph nodes on cross sectional images at different levels
- Identify the structural change at T4 vertebral level or angle of Louis

HISTOLOGY OF RESPIRATORY EPITHELIUM AND ITS VARIATIONS IN DIFFERENT PARTS OF CONDUCTING SYSTEM • Identify the respiratory epithelium on microscope • Describe respiratory epithelium • Discuss the component cells of respiratory epithelium • Discuss the variations of epithelium in different parts of conducting system of respiratory tracts **HISTOLOGY OF TRACHEA AND LUNG** • Describe the histological features of different layers of trachea • Describe divisions of bronchial tree • Discuss the structural variation in different parts of bronchial tree • Describe the structure of alveoli and inter-alveolar septum. • Discuss the functions of different type of cells, forming the alveolar wall • Describe the structure and function of blood -air barrier	  
DEVELOPMENT OF RESPIRATORY SYSTEM (EMBRYO) • Review the intra embryonic mesoderm and its parts • Discuss the divisions of lateral plate mesoderm • Describe the Cephalocaudal and transverse foldings of embryonic disc • Discuss the formation of Pleuropericardial and Pleuroperitoneal membranes • Discuss the steps of development of diaphragm from its composite embryonic derivatives • Discuss the formation of Laryngo- tracheal groove and 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 (Tracheoesophagal fistula etc)	

BIOCHEMISTRY

TOPIC	*TEACHING STRATEGY*
• Explain chemical structure of phospholipids and their biochemical role in ARDS • Discuss the normal regulation of pH, normal ABGs ranges , anion gap and their biochemical significance • Explain the mechanism of respiratory pH disturbances and their ABGs correlation • Explain the mechanism of metabolic pH disturbances and their ABGs correlation • Use the pH meter to estimate pH of Gastric juice, Plasma, Saliva & Urine	 

COMMUNITY MEDICINE

TOPIC	*TEACHING STRATEGY*
TRAVEL MEDICINE • List the diseases occurring in travelers and their pathogenic organisms • Discuss the control measures for prevention of diseases among travelers and role of international health regulations	

PATHOLOGY

TOPIC	*STRATEGY*
• Describe pathophysiology of Asthma • Overview of types of Hypersensitivity Reactions	

PHARMACOLOGY

TOPIC	TEACHING STRATEGY
Drugs used in Asthma & COPD • Classify drugs used for the management of asthma • Demonstrate methods of application of aerosol inhalers and nebulizers	

PHYSIOLOGY

TOPIC	TEACHING STRATEGY
Mechanics of respiration • Briefly describe the function of respiratory passages • Explain mechanism of pulmonary ventilation with reference to thoracic cage & muscles of respiration • Define alveolar pressure & pleural pressure, alveolar ventilation • Discuss transpulmonary pressure and its changes during respiration • Define dead space **Lung compliance** • Define lung compliance & list factors affecting lung compliance • Describe the role of surfactant in maintain lung compliance • Differentiate compliance work, tissue resistance work & airway resistance work **Pulmonary volumes and capacities** • List the pul. vol& capacity with their normal values & significance in pulmonary function test • Determine functional residual capacity, residual volume & total lung capacity, helium dilution method **Pulmonary circulation V/Q relationship** • Describe pressure in pulmonary circulation & blood flow three various zones of lung (1,2,3) • Explain pulmonary capillary dynamics • Explain mechanism of development of pulmonary edema and importance of ventilation /perfusion • Ratio & effects of mismatching of this ratio	  

Diffusion of gases • Define respiration unit & respiration membrane • Describe mechanics of diffusion across respiration membrane & factors effecting diffusion • List partial pressure of respiration gases in atmosphere, humidified, alveolar & expired air • Briefly described the diffusing capacity of O2 and CO2 **O2 transport O2Hb curve** • Explain transport of O2 from lungs to body tissues • Briefly describe the role of Hb in O2 transport • Explain oxy-Hb dissociation curve and factors that shift this curve • Define Bohr effect **Transport of Co2 in relation to physiology.** • Describe the carriage in blood (chloride shift) • Relate effect of CO2 and O2 transport (Haldane effect) • Define respiratory exchange ratio **Respiratory adjustment to exercise, high altitude & deep sea** • Describe resp. adjustments during exercise • Explain physiology of acclimatization • Explain physiology of deep sea diving **Hypoxia and its type** • Define hypoxia and its types • Describe coughing & sneezing reflex **Regulation of respiration** • List the respiratory centers & their effect on regulation of respiration • Describe the chemical control of respiration (chemo receptors)	
• **Perform** the experiments on power lab with respect to respiration	

PULMONOLOGY (CHEST MEDICINE)

TOPIC	*TEACHING STRATEGY*
GASEOUS TRANSPORT • **Correlate** pulmonary function tests with respiratory diseases(phy) • **Describe** ABG analysis and discuss the interpretation	

RADIOLOGY

TOPIC	*TEACHING STRATEGY*
• **Identify** the normal radiology of chest on X-ray	

RESEARCH AND SKILLS LAB

TOPIC	*TEACHING STRATEGY*
• Demonstrate the correct steps and sequence of respiratory system examination	

LEARNING RESOURCES

SUBJECT	*RESOURCES*
ANATOMY	**A. GROSS ANATOMY** 1. K.L. Moore, Clinically Oriented Anatomy 2. Neuro Anatomy by Richard Snell **B. HISTOLOGY** 1. B. Young J. W. Health Wheather's Functional Histology **C. EMBRYOLOGY** 1. Keith L. Moore. The Developing Human 2. Langman's Medical Embryology
BIOCHEMISTRY	**A. TEXTBOOKS** 1. Harper's Illustrated Biochemistry 2. Lehninger Principle of Biochemistry 3. Biochemistry by Devlin
COMMUNITY MEDICINE	**A. TEXT BOOKS** 1. Community Medicine by Parikh 2. Community Medicine by M Illyas 3. Basic *Statistics* for the Health Sciences by Jan W Kuzma
PATHOLOGY/MICROBIOLOGY	**A. TEXT BOOKS** 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD 1. http://library.med.utah.edu/WebPath/webpath.html 2. http://www.pathologyatlas.ro/
PHARMACOLOGY	**A. TEXT BOOKS** 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung
PHYSIOLOGY	**A. TEXTBOOKS** 1. Textbook Of Medical Physiology by Guyton And Hall 2. Ganong ' S Review of Medical Physiology 3. Human Physiology by Lauralee Sherwood 4. Berne & Levy Physiology 5. Best & Taylor Physiological Basis of Medical Practice **B. REFERENCE BOOKS** 1. Guyton & Hall Physiological Review 2. Essentials Of Medical Physiology by Jaypee 3. Textbook Of Medical Physiology by InduKhurana 4. Short Textbook Of Physiology by Mrthur 5. NMS Physiology

ADDITIONAL LEARNING RESOURCES

Hands-on Activities/ Practical	Students will be involved in Practical sessions and hands-on activities that link with the respiratory module to enhance learning with understanding.
Labs	• Utilize the lab to relate the knowledge to the specimens and models available.
Skill Lab	• A skills lab provides the simulators to learn the basic skills and procedures. This helps build the confidence to approach the patients.
Videos	Video familiarize the student with the procedures and protocols to assist patients.
Computer Lab/CDs/DVDs/Internet Resources:	It increases the knowledge. Students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
Self Learning	Self learning is scheduled to search for information to solve cases, read through different resources and discuss among the peers and with the faculty to clarify the concepts.

ASSESSMENT METHODS:

Theory:

- **Best Choice Questions (BCQs)** also known as MCQs (Multiple Choice Questions) are used to assess objectives covered in each module.

- A BCQ has a statement or clinical scenario followed by four options (likely answer).
- Students after reading the statement/scenario select ONE, the most appropriate response from the given list of options.
- **Correct answer carries one mark, and incorrect 'zero mark'. There is no negative marking.**
- Students mark their responses on specified computer-based/OMR sheet designed for LNHMC.

OSPE/OSCE: Objective Structured Practical/Clinical Examination:

- Each student will be assessed on the same content and have same time to complete the task.
- Comprise of 12-25 stations.
- Each station may assess a variety of clinical tasks, these tasks may include history taking, physical examination, skills and application of skills and knowledge
- Stations are observed, unobserved, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Unobserved will be static stations in which there may be an X-ray, Labs reports, pictures, clinical scenarios with related questions for students to answer.
- Rest station is a station where there is no task given and in this time student can organize his/her thoughts.

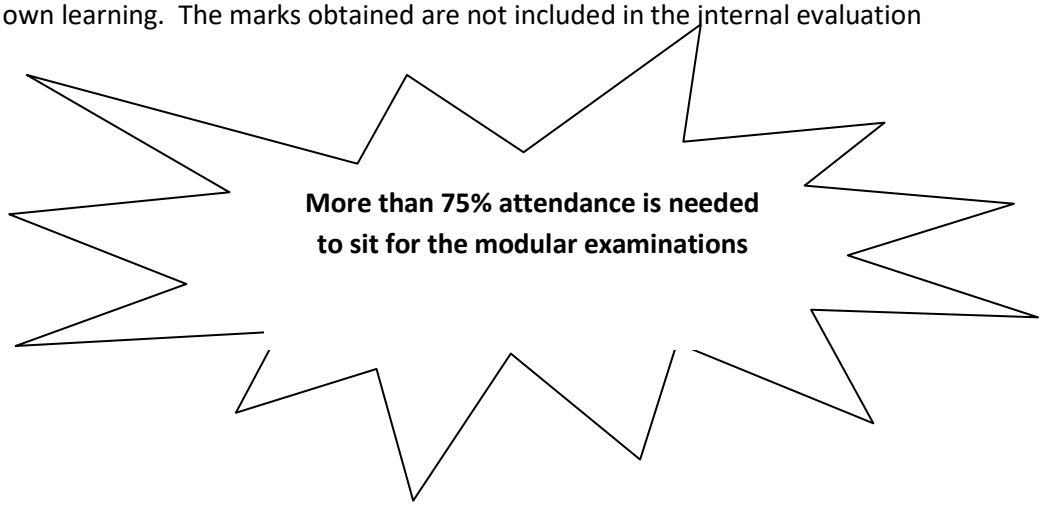
Internal Evaluation

- Students will be assessed to determine achievement of module objectives through the following:
  - **Module Examination:** will be scheduled on completion of each module. The method of examination comprises theory exam which includes BCQs and OSPE (Objective Structured Practical Examination).
  - **Graded Assessment of students by Individual Department**: Quiz, viva, practical, assignment, small group activities such as CBL, TBL, TOL, online assessment, ward activities, examination, and log book.
- Marks of both modular examination and graded assessment will constitute 20% weightage.
- As per JSMU policy, this 20% will be added by JSMU to Final Theory Examination.

Example : Number of Marks allocated for Final Theory and Internal Evaluation			
	Final Examination Theory Marks	**Internal Evaluation (Class test + Assignments + Modular Exam)**	**Total (Theory)**
	80%	20%	100%

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



MODULAR EXAMINATION RULES & REGULATIONS (LNH&MC)

- 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.

JSMU Grading System

- It will be based on GPA – 4 system

Marks obtained in Percentage range	Numerical Grade	Alphabetical Grade
80-100	4.0	**A+**
75-79	4.0	**A**
70-74	3.7	**A-**
67-69	3.3	**B+**
63-66	3.0	**B**
60-62	2.7	**B-**
56-59	2.3	**C+**
50-55	2.0	**C**
<50 Un-grade-able	0	**U**

- A candidate obtaining GPA less than 2.00 (50%) is declared un-graded (fail).
- Cumulative transcript is issued at the end of clearance of **all** modules.

SCHEDULE:

WEEKS	1ST YEAR	MONTH
WEEK 1	FOUNDATION MODULE	9th Feb 2019
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		26th March 2019
	MODULAR EXAM	28th & 29th March
WEEK 1	BLOOD MODULE	1st April 2019
WEEK 2		
WEEK 3		
WEEK 4		27th April 2019
	MODULAR EXAM	29th & 30th April 2019
WEEK 1	LOCOMOTOR MODULE	2nd May 2019
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		
WEEK 7		
WEEK 8		29th June 2019
	MODULAR EXAM	1st & 2nd July 2019
WEEK 1	RESPIRATORY MODULE - I	3 July 2019
WEEK 2		
WEEK 3		
WEEK 4		27 Jul 2019
	MODULAR EXAM	29&30 Jul 2019*
WEEK 1	CVS MODULE - I	Aug 2019*
WEEK 2		
WEEK 3		
WEEK 4		Aug 2019*
	MODULAR EXAM	Aug-Sep 2019*
PREPARATORY LEAVE		

*Final dates will be announced later