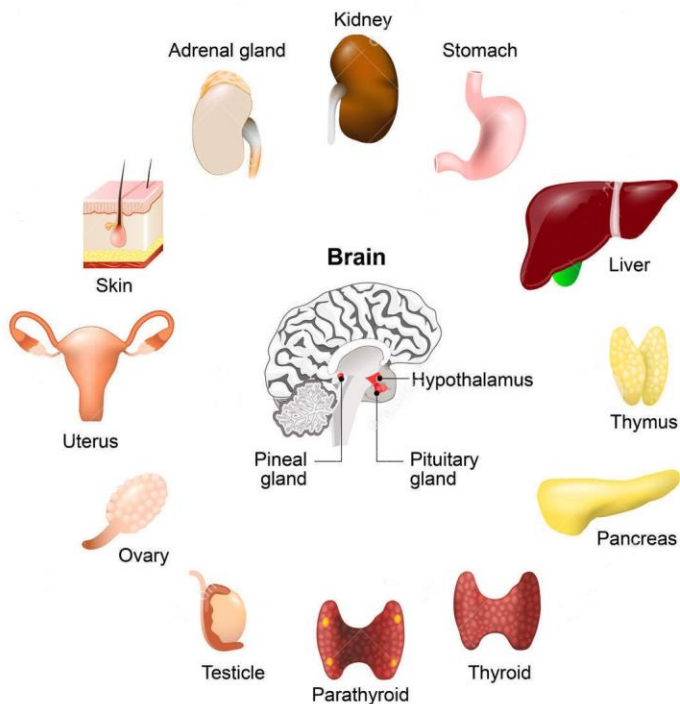


ENDOCRINE SYSTEM



STUDY GUIDE

ENDOCRINE-I MODULE

SECOND YEAR MBBS SEMESTER 3

27th Feb – 26th March 2019
Duration: 4 weeks



Forms of Chemical Signaling	
Autocrine	A cell targets itself.
Signaling across gap junctions	A cell targets a cell connected by gap junctions.
Paracrine	A cell targets a nearby cell.
Endocrine	A cell targets a distant cell through the bloodstream.



**LIAQUAT NATIONAL HOSPITAL
& MEDICAL COLLEGE**



STUDY GUIDE FOR ENDOCRINE MODULE

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Module name: **Endocrine**

Semester: **Three**

Year: **Two**

Duration: **4 weeks (Feb 2018 – March 2018)**

Timetable hours: **Lectures, Case-Based Learning (CBL), Self-Study, Practical, Skills, Demonstrations**

MODULE INTEGRATED COMMITTEE

MODULE COORDINATOR:	<ul style="list-style-type: none"> • Dr. Kashif Nisar, Biochemistry
CO-COORDINATORS:	<ul style="list-style-type: none"> • Professor Nighat Huda, DHCE • Dr. Naila Parveen, Physiology

DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS
ANATOMY <ul style="list-style-type: none"> • Professor Zia-ul-Islam 	ENDOCRINOLOGY <ul style="list-style-type: none"> • Dr. Aqiba Sarfaraz
BIOCHEMISTRY <ul style="list-style-type: none"> • Professor Naheed Qadir 	RESEARCH & SKILLS DEVELOPMENT CENTER <ul style="list-style-type: none"> • Dr. Kahkashan Tahir
COMMUNITY MEDICINE <ul style="list-style-type: none"> • Professor Rafiq Soomro 	
PATHOLOGY <ul style="list-style-type: none"> • Professor Naveen Faridi • Dr. Howrah Humaira Ali 	
PHARMACOLOGY <ul style="list-style-type: none"> • Professor Nazir Ahmad Solangi 	
PHYSIOLOGY <ul style="list-style-type: none"> • Professor Syed Hafeezul Hassan 	
DEPARTMENT OF HEALTHCARE EDUCATION	
<ul style="list-style-type: none"> • Professor Nighat Huda • Dr. Afifa Tabassum • Dr. Sobia Ali • Dr. M. Suleman Sadiq • Dr. Mehnaz Umair 	
LNH&MC MANAGEMENT	
<ul style="list-style-type: none"> • Professor KU Makki, Principal LNH&MC • Dr. Shaheena Akbani, Director A.A & R.T LNH&MC 	
STUDY GUIDE COMPILED BY: Department of Health Care Education	<ul style="list-style-type: none"> • Dr. Muhammad Suleman Sadiq

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:

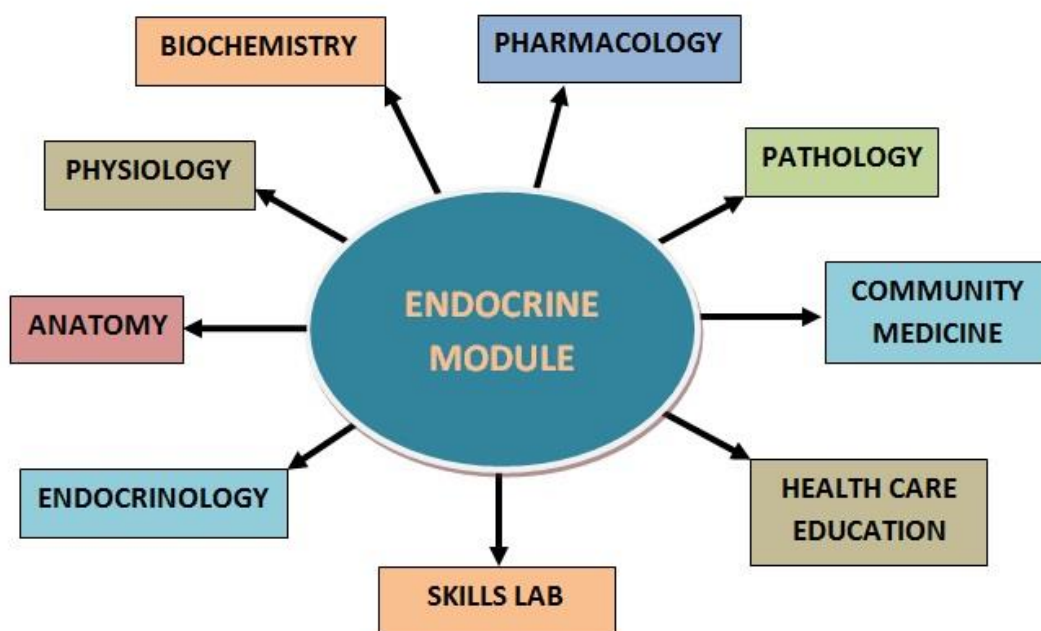
- Communicates information on organization and management of the module.
This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small 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* in 3rd and 4th semesters at LNMC in accordance with the JSMU guidelines and most recent developments that have an impact on individual health.

INTEGRATED CURRICULUM comprises of system-based modules such as Head and Neck, Neurosciences and Endocrinology 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 ENDOCRINE MODULE



LEARNING METHODOLOGIES

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

- Interactive Lectures
- Hospital / Clinic visits
- Small Group Discussion
- 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 DISCUSSION (SMALL GROUP DISCUSSIONS): 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.

Apart from attending daily scheduled sessions, students too should engage in self-study to ensure that all the objectives are covered.



SEMESTER 3 MODULE 3 : ENDOCRINE

INTRODUCTION

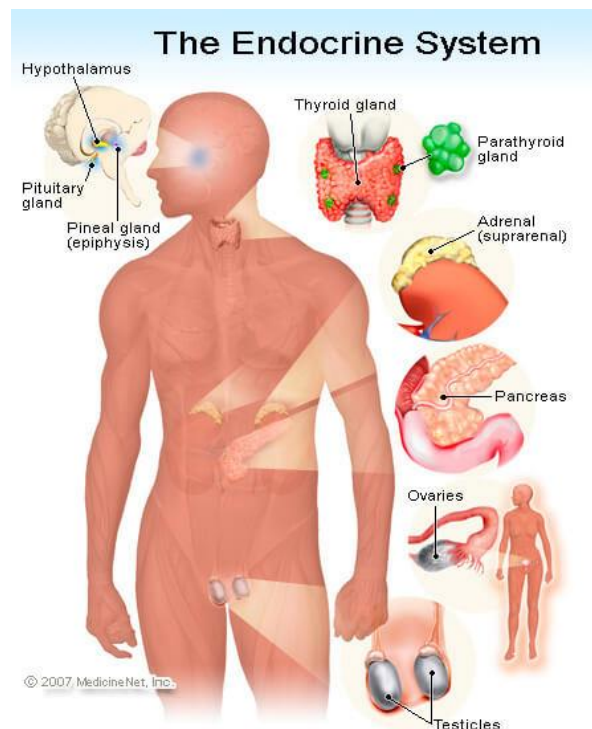
The Endocrine system relays information and maintains a constant internal environment of the body called homeostasis. It acts through chemical messengers called hormones that influence growth, development, and metabolic activities. The action of the endocrine system is measured in minutes, hours, or weeks and is more generalized than the action of the nervous system.

This M.B.B.S second year module will help you develop knowledge and understanding of the:

- Basic concepts of molecular endocrinology that underpin hormone actions, how dysfunction relates to primary pathogenesis, and how this knowledge informs improvement in diagnosis and the potential for novel therapies
- Hypothalamic - pituitary axes and their role in health and disease, including the reproductive, adrenal, and thyroid axes
- Neuro-endocrine control of food intake, energy expenditure and obesity
- Theories of the etiology and pathogenesis of type 2 diabetes mellitus

Similarly, this module of endocrine system will enable you to recognize the clinical presentations of common endocrinological and metabolic disorders and relate clinical manifestations to basic sciences. This Endocrine module will be revisited in the following years.

The study guide will help you prioritize the important topics for learning in relation to the module objectives through lectures, demonstrations, tutorials, practicals and skills lab sessions.



COURSE TOPICS, OBJECTIVES AND TEACHING STRATEGIES

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

OUTCOMES & OBJECTIVES	FACULTY	LEARNING STRATEGY
Overview of the endocrine glands in the body		
<ul style="list-style-type: none"> Define and classify the glands 	Anatomy	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Discuss functions of endocrine glands 		
<ul style="list-style-type: none"> Describe the location of all endocrine glands in the body 		
<ul style="list-style-type: none"> Explain the structure and functions of all endocrine organs in the body 		
<ul style="list-style-type: none"> Define the terms endocrine, paracrine and autocrine 	Physiology	
<ul style="list-style-type: none"> Describe the concept of hormone receptors and second messenger in hormone action 		
<ul style="list-style-type: none"> Describe the synthesis, functions and regulations of the hormones 		
<ul style="list-style-type: none"> Describe the regulation of hormone secretion by positive and negative feedback 		
<ul style="list-style-type: none"> Classify the different hormones and describe their chemical structure 	Biochemistry	
<ul style="list-style-type: none"> Describe the biochemical function of hormones 		
Hypothalamic-pituitary end organ axis		
<ul style="list-style-type: none"> Describe the development and congenital anomalies of Pituitary gland 	Anatomy	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> List the hormones secreted by the pituitary gland 	Pathology	
<ul style="list-style-type: none"> Describe the structural and functional relationships between the hypothalamus and the pituitary gland 	Pathology	
<ul style="list-style-type: none"> Describe the hormones secreted by the anterior pituitary gland and describe their hypothalamic control 	Physiology	

<ul style="list-style-type: none"> Discuss the anterior pituitary secretions and related disorders 	Physiology	
<ul style="list-style-type: none"> Briefly describe posterior pituitary syndromes 	Pathology	
<ul style="list-style-type: none"> Describe the Microscopic features of pituitary gland 	Anatomy	Practical
<ul style="list-style-type: none"> Describe the gross anatomy , neurovascular supply and clinical importance of Pituitary gland 	Anatomy	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Describe the structure, secretion, mode of action and functions of hypothalamic hormones 	Biochemistry	
Biochemical functions of growth hormones and metabolic effects of growth hormones		
<ul style="list-style-type: none"> Describe physiological function of growth hormone and related disorders 	Physiology	Interactive Lectures/Case-Based Discussion
<ul style="list-style-type: none"> Describe the structure, biosynthesis, actions and regulation of growth hormone 	Biochemistry	
<ul style="list-style-type: none"> Describe the effect of growth hormone on carbohydrates, proteins and lipids 	Biochemistry	
Molecular structure, biochemical function of anterior pituitary hormones		
<ul style="list-style-type: none"> Discuss pituitary hormones other than growth hormone with clinical complications and diseases 	Biochemistry	Interactive Lectures/Case-Based Discussion
<ul style="list-style-type: none"> Describe the molecular structure of anterior pituitary hormones 		
<ul style="list-style-type: none"> Discuss the biochemical function of anterior pituitary hormones 		
<ul style="list-style-type: none"> Discuss the clinical manifestations of anterior pituitary disease Discuss the classification of pituitary adenomas 	Pathology	
<ul style="list-style-type: none"> Discuss the hypothalamic and ant -pituitary hormones and its disorders Explain pharmacokinetics, dynamics & toxicity of the drugs used to treat their disorders 	Pharmacology	

Hormones of posterior pituitary, their biochemical functions and related disorders		
<ul style="list-style-type: none"> List the hormones secreted by posterior pituitary gland and describe their effects 	Biochemistry	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Describe posterior pituitary secretions and disorders 	Physiology	
<ul style="list-style-type: none"> Describe the biochemical functions of oxytocin and ADH and their related disorders 	Biochemistry	
<ul style="list-style-type: none"> List the Post-pituitary hormones Describe their basic and clinical pharmacology Explain pharmacokinetics, dynamics & toxicity of the drugs used to treat different disorders of post-pituitary 	Pharmacology	Interactive Lecture
Difference between hypo and hyper secretion of hypothalamus and pituitary hormones		
<ul style="list-style-type: none"> Differentiate between hypo and hyper secretion of hypothalamus and pituitary hormones 	Biochemistry	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Discuss acromegaly and dwarfism 	Biochemistry	
<ul style="list-style-type: none"> Identify pituitary abnormalities, dwarfism, gigantism and acromegaly 	Physiology	
Thyroid gland		
<ul style="list-style-type: none"> Describe the development and congenital anomalies of thyroid gland 	Anatomy	Interactive Lecture
<ul style="list-style-type: none"> Describe the microscopic features of thyroid gland 	Anatomy	Practical
<ul style="list-style-type: none"> Describe the gross anatomy, neurovascular supply and clinical importance of thyroid gland 	Anatomy	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Explain the formation and secretion of T3 and T4 Discuss the importance of iodine metabolism and iodine pump Describe actions of thyroid hormone on development and metabolism and associated disorders Describe the role of TSH on regulation of thyroid hormones 	Physiology	

<ul style="list-style-type: none"> Describe the structure, synthesis, mode of action and metabolic functions of thyroid gland 	Biochemistry	Interactive Lectures
<ul style="list-style-type: none"> Describe the hypothalamus-pituitary-thyroid homeostasis Define Hypothyroidism List the major causes of hypothyroidism List the main clinical features of hypothyroidism Differentiate between cretinism and myxedema with regards to etiology, pathogenesis, clinical features and lab diagnosis Define Hashimoto's thyroiditis Discuss the pathogenesis of Hashimoto's thyroiditis and its clinical manifestations Define hyperthyroidism List the causes of hyperthyroidism List the main clinical features of hyperthyroidism Discuss Grave's disease, hyperthyroidism thyrotoxicosis and Goiter including pathogenesis and clinical features 	Pathology	Interactive Lectures/Small Group Discussion
Differences between hypo and hyperthyroidism		
<ul style="list-style-type: none"> Interpret thyroid function tests (T3, T4, TSH, I2 and LATS) 	Biochemistry	Practicals
<ul style="list-style-type: none"> Describe the diagnostic modalities available to diagnose thyroid pathology Interpret thyroid function tests 	Pathology	
<ul style="list-style-type: none"> Identify the signs and presentation, causes and investigation of hypothyroidism/hyperthyroidism 	Endocrinology	Interactive Lectures
<ul style="list-style-type: none"> Review the pathogenesis of Hashimoto's thyroiditis and Grave's Disease 	Pathology	
<ul style="list-style-type: none"> Identify the slides related to benign lesion of thyroid gland 		Practical
Hypothyroidism		
<ul style="list-style-type: none"> Describe how drugs influence the steps in synthesis and release of thyroid hormones Describe the clinical presentation and treatment of hypothyroidism Describe clinical presentation and treatment of endemic goiter 	Pharmacology	Small Group Discussion

<ul style="list-style-type: none"> Describe the clinical presentation and pharmacology of drugs used in hyperthyroidism Describe the treatment of thyroid storm and myxedema coma 		
<ul style="list-style-type: none"> Describe the causes and effects of iodine deficiency on brain and control of this problem 	Community Medicine	Small Group Discussion
Parathyroid Gland		
<ul style="list-style-type: none"> Describe the development and congenital anomalies of parathyroid glands 	Anatomy	Small Group Discussion
<ul style="list-style-type: none"> Describe the microscopic features of parathyroid glands 	Anatomy	
<ul style="list-style-type: none"> Describe the gross anatomy, neurovascular supply and clinical importance of parathyroid glands 	Anatomy	
<ul style="list-style-type: none"> Explain the synthesis and function of parathyroid hormone (calcium metabolism) 	Biochemistry	Interactive Lecture
<ul style="list-style-type: none"> Discuss secretion, action and functions of parathyroid hormones 	Physiology	Interactive Lectures/Small Group Discussion
<ul style="list-style-type: none"> Define hyperparathyroidism Discuss the causes of hyperparathyroidism and clinical manifestations Define hypoparathyroidism Discuss causes and clinical manifestations of hypoparathyroidism and pseudohypoparathyroidism 	Pathology	
<ul style="list-style-type: none"> Discuss calcitonin hormone and role of vitamin D List the disorders associated with calcium homeostasis which include tetany, Chvostek's sign 	Physiology	
<ul style="list-style-type: none"> Discuss the role of parathyroid hormone, calcitonin and Vitamin D in Calcium homeostasis Name the causes of hypercalcemia, including drug induced hypercalcemia Describe the signs, symptoms and complications of hypercalcemia Discuss the treatment of hypercalcemia Explain the etiology of hypocalcemia Describe signs symptoms and lab evaluation of hypocalcemia Discuss treatment of hypocalcemia 	Pharmacology	

Pancreatic hormones		
<ul style="list-style-type: none"> Describe the development and congenital anomalies of endocrine portions of Pancreas 	Anatomy	Interactive Lecture
<ul style="list-style-type: none"> Describe the microscopic features of endocrine portions of Pancreas 	Anatomy	Interactive Lecture/ Practical
<ul style="list-style-type: none"> Describe the gross anatomy , neurovascular supply and clinical importance of endocrine portions of Pancreas 	Anatomy	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> Discuss the molecular structure, mode of action and biochemical functions of insulin 	Biochemistry	
<ul style="list-style-type: none"> Describe hormones of pancreas and insulin Explain the role of insulin in maintaining blood glucose concentration Differentiate between neurogenic and nephrogenic diabetes insipidus 	Physiology	
<ul style="list-style-type: none"> Discuss the molecular structure and biochemical function of glucagon and somatostatin 	Biochemistry	
<ul style="list-style-type: none"> Describe glucagon, somatostatin and pancreatic Polypeptides 	Physiology	
<ul style="list-style-type: none"> Describe the regulation of blood glucose level, hyper and hypoglycemia and complications of diabetes mellitus 	Biochemistry	
<ul style="list-style-type: none"> Define diabetes mellitus Describe the diagnostic criteria and guidelines for diagnosis of diabetes Discuss the classification of diabetes mellitus List the differences between Type 1 and Type 2 diabetes mellitus 	Pathology	
<ul style="list-style-type: none"> Explain the pathogenesis of type-I and type II diabetes, beta cell dysfunction, genetic susceptibility and diabetes in pregnancy 	Pathology	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> Interpret laboratory diagnosis of diabetes mellitus 		
<ul style="list-style-type: none"> Discuss the morphology & clinical features of type I & II Diabetes including classic triad & chronic manifestations 		

<ul style="list-style-type: none"> • Discuss acute metabolic complications & Ketoacidosis • Explain the morphology and clinical features of chronic complications of Diabetes Mellitus 		
<ul style="list-style-type: none"> • Demonstrate the estimation of blood glucose level by Kit method & laboratory interpretations for diagnosis of diabetes mellitus • Formulate graph of Glucose Tolerance Test (GTT) on the basis of given data 	Biochemistry	Practical
<ul style="list-style-type: none"> • Classify oral hypoglycemic drugs • Describe the pharmacology of oral hypoglycemic agents, adverse effects and important drug interactions 	Pharmacology	Interactive Lecture/Case-Based Discussion
<ul style="list-style-type: none"> • Explain different types of diabetes its causes, clinical features and investigation 	Endocrinology	
<ul style="list-style-type: none"> • List the different insulin preparations (Classification, onset, peak and duration of action) • Describe conventional and intensive insulin therapy and their advantages and disadvantages • Describe the adverse effects of insulin • Describe injectable hypoglycemic drugs other than insulin (pramlintide and exenatide) 	Pharmacology	
<ul style="list-style-type: none"> • Describe Diabetes • Enumerate Risk Factors of Diabetes Mellitus (DM) • Explain Complications of Diabetes • Discuss Preventive measures of Diabetes Mellitus 	Community Medicine	Interactive Lecture
<ul style="list-style-type: none"> • Discuss the complication of diabetes which includes <ul style="list-style-type: none"> ○ Diabetic Foot ○ Diabetic Ketoacidosis/Hyperosmolar Coma 	Multidisciplinary	Small Group Discussion
<ul style="list-style-type: none"> • Demonstrate S/C insulin injection technique using an insulin syringe 	Skills lab	Hands-On Skills
Obesity and the body mass index		
<ul style="list-style-type: none"> • Explain the various levels of obesity on the basis of body mass index, hazards and prevention 	Community Medicine	Interactive Lecture

Adrenal glands		
<ul style="list-style-type: none"> Describe the development and congenital anomalies of adrenal gland 	Anatomy	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> Describe the microscopic features of adrenal gland 	Anatomy	
<ul style="list-style-type: none"> Describe the gross anatomy , neurovascular supply and clinical importance of adrenal gland 	Anatomy	
<ul style="list-style-type: none"> Describe the chemistry, synthesis and metabolic functions of glucocorticoids and mineralocorticoids along with their abnormalities 	Biochemistry	Interactive Lecture/Small Group Discussion
<ul style="list-style-type: none"> Explain the synthesis of glucocorticoid hormones Identify the actions of glucocorticoids on metabolism and target cells Discuss the mechanism for regulation of glucocorticoid secretion. Describe the disorders associated with glucocorticoid hormones including Addison's disease, Cushing syndrome 	Physiology	
<ul style="list-style-type: none"> Define Aldosterone escape, Primary Aldosteronism and Androgenital Syndrome Explain the mechanism of action of mineralocorticoids Discuss the mechanism of actions of aldosterone and its regulation 		
<ul style="list-style-type: none"> Explain the mechanism of secretion and actions of medullary hormones List the types of adrenergic receptors and their functions on target organs Enumerate consequences of over and under secretion of medullary hormones (pheochromocytoma) 		
<ul style="list-style-type: none"> Describe the chemistry of adrenal medullary hormones and pheochromocytoma 	Biochemistry	
Classification of corticosteroids and their functions analysis, kinetics, dynamics and their inhibition		
<ul style="list-style-type: none"> Explain the systemic effects of corticosteroids and to relate these to the adverse effects, precautions and contraindications of steroid therapy Classify the commonly used corticosteroid preparations List the uses of corticosteroid preparations Explain corticosteroid withdrawal effect and its prevention 	Pharmacology	Interactive Lecture

Concept of health management system, issues and challenges, solutions and improvement of Health management system		
<ul style="list-style-type: none"> • Discuss the health management information of Pakistan in general and specific to the district • Identify the sources of HMIS • Discuss the importance of HMIS 	Community Medicine	Interactive Lectures
<ul style="list-style-type: none"> • Describe the various stages of health education and its principles • Describe various models of behavior change • Discuss the principles for Health Education 		
<ul style="list-style-type: none"> • Describe the various methods of health education program of Pakistan 		
Research		
Developing a Questionnaire <ul style="list-style-type: none"> • Define research, its types and its importance • Discuss research questions • List characteristics of a good research question • Phrase a research question correctly 	Community Medicine	Interactive Lectures/Small Group Discussion
Performing a literature search <ul style="list-style-type: none"> • Describe the importance of Literature Review • Identify different sources of literature • Use databases to search literature 		
Referencing <ul style="list-style-type: none"> • Discuss referencing of different sources of literature • Discuss the different styles for referencing 		
Epidemiological study Designs <ul style="list-style-type: none"> • Classify epidemiological study designs • Discuss various observational study designs • Explain and discuss advantages and disadvantages of observational study designs • Discuss application of observational study designs 		
Writing background and Rationale of study <ul style="list-style-type: none"> • Identify different sources of literature • Conduct literature search by using different databases • Discuss referencing of different sources of literature • Develop background and build rationale for a research question 		

LEARNING RESOURCES

SUBJECT	RESOURCES
ANATOMY	<p>A. <u>GROSS ANATOMY</u></p> <ol style="list-style-type: none"> 1. K.L. Moore, Clinically Oriented Anatomy 2. Neuro Anatomy by Richard Snell <p>B. <u>HISTOLOGY</u></p> <ol style="list-style-type: none"> 1. B. Young J. W. Health Wheather's Functional Histology <p>C. <u>EMBRYOLOGY</u></p> <ol style="list-style-type: none"> 1. Keith L. Moore. The Developing Human 2. Langman's Medical Embryology
BIOCHEMISTRY	<p>A. <u>TEXTBOOKS</u></p> <ol style="list-style-type: none"> 1. Harper's Illustrated Biochemistry 2. Lehninger Principle of Biochemistry 3. Biochemistry by Devlin
COMMUNITY MEDICINE	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Community Medicine by Parikh 2. Community Medicine by M Illyas 3. Basic <i>Statistics</i> for the Health Sciences by Jan W Kuzma
PATHOLOGY/MICROBIOLOGY	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD
	<ol style="list-style-type: none"> 1. http://library.med.utah.edu/WebPath/webpath.html 2. http://www.pathologyatlas.ro/
PHARMACOLOGY	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung
PHYSIOLOGY	<p>A. <u>TEXTBOOKS</u></p> <ol style="list-style-type: none"> 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 <p>B. <u>REFERENCE BOOKS</u></p> <ol style="list-style-type: none"> 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

OTHER LEARNING RESOURCES

<u>Hands-on Activities/ Practical</u>	Students will be involved in Practical sessions and hands-on activities that link with the endocrine module to enhance the learning.
<u>Labs</u>	Utilize the lab to relate the knowledge to the specimens and models available.
<u>Skills Lab</u>	A skills lab provides the simulated learning experience to learn the basic skills and procedures. This helps build the confidence to approach the patients.
<u>Videos</u>	Video familiarize the student with the procedures and protocols to assist patients.
<u>Computer Lab/CDs/DVDs/Internet Resources:</u>	To increase the knowledge students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
<u>Self Learning</u>	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.

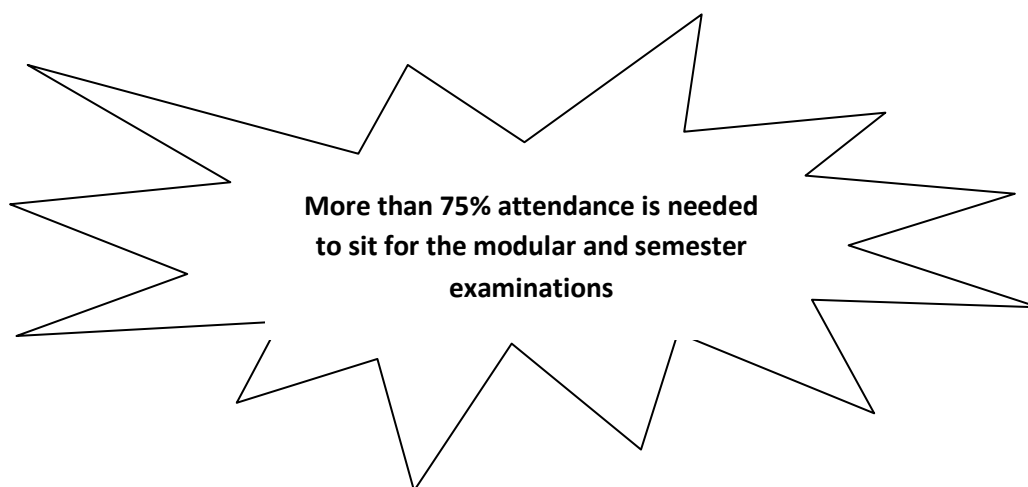
Internal Evaluation

- 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 Semester Examination.

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

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	2nd YEAR SEMESTER 3	DATES
WEEK 1	HEAD & NECK MODULE	Dec 2018
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		10th Jan 2019
	MODULAR EXAM	11 th Jan & 12 th Dec 2019
WEEK 1	NEUROSCIENCES MODULE	14 th Jan 2019
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		24th Feb 2019
	MODULAR EXAM	25 th & 26 th Feb 2019
WEEK 1	ENDOCRINOLOGY MODULE	27 th Feb 2019
WEEK 2		
WEEK 3		
WEEK 4		22 nd March 2019
	MODULAR EXAM	25 th & 26 th March 2019*
PREPARATORY LEAVE		
	SEMESTER EXAM*	

*Final dates will be announced later.