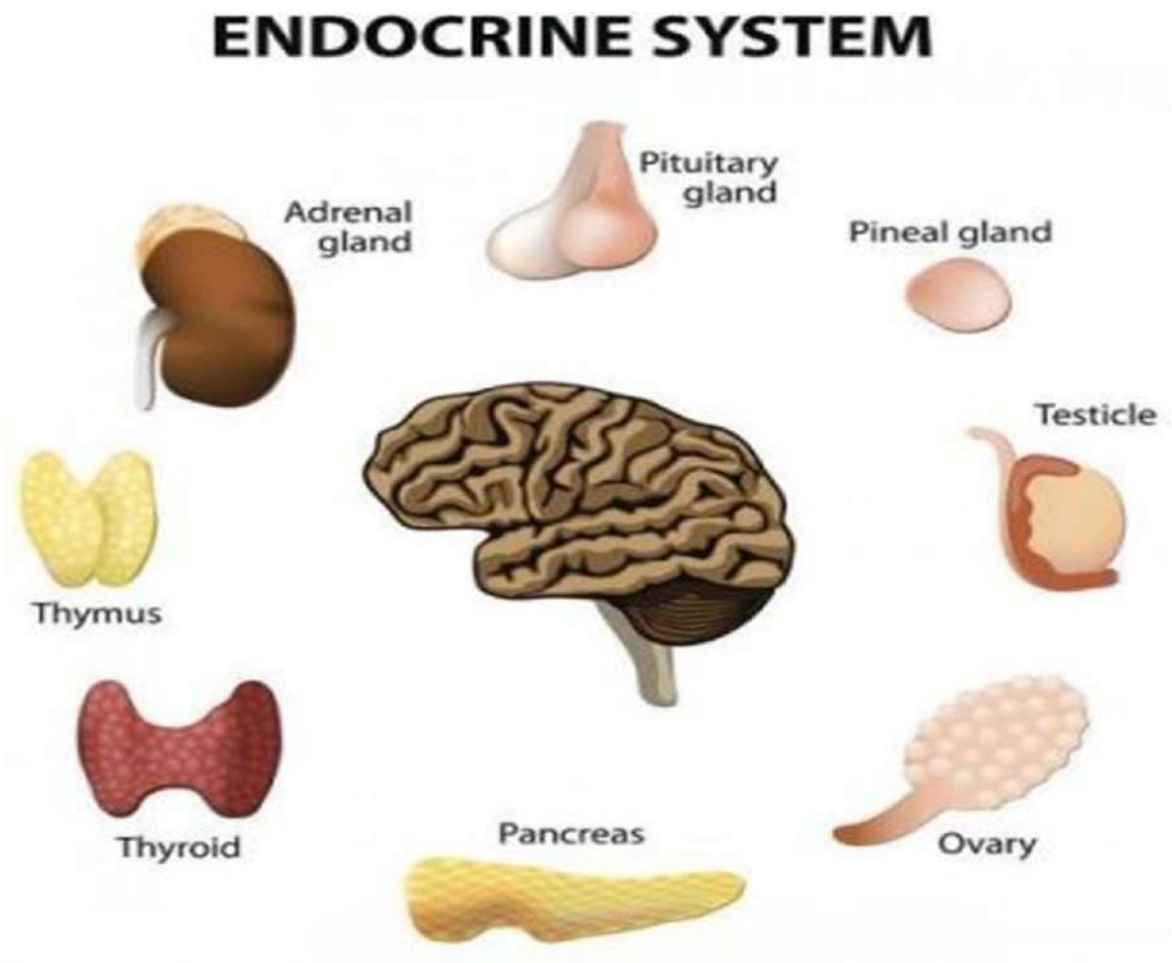

ENDOCRINE SYSTEM 2ND YEAR STUDY GUIDE

This Study guide of the module/course outlines the key components and areas for the facilitation of the students.

Department of Medical Education

Vision and Mission of KGMC

Khyber Medical University: Vision

Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Khyber Girls Medical College: Vision

"Excellence in health care, research ,teaching and training in the service of Humanity"

Khyber Girls Medical College: Mission

The mission of KGMC is to promote compassionate and professional health care leaders Who are knowledgeable, skillful, and community oriented lifelong learners serving humanity through evidence based practice

Curriculum Committee KGMC

Chair:

Professor Dr.Zahid Aman , Dean KGMC.

Co-Chair:

Dr. Sabina Aziz, Associate Dean KGMC.

Clinical Sciences:

- Dr. Mohammad Noor Wazir ,Department of Medicine KGMC/HMC
- Dr. Bushra Rauf Department of Gynae KGMC/HMC.
- Dr. Sofia Iqbal, Department of Ophthalmology KGMC/HMC.
- Dr. Said Amin Department of Medicine KGMC/HMC.
- Dr. Ghareeb Nawaz Department of ENT KGMC/HMC.
- Dr. Jamshed Alam Department of Surgery KGMC/HMC.
- Dr. Ambreen Ahmad, Department of Pediatrics KGMC/HMC.
- Dr. Ain-ul-Hadi Department of Surgery KGMC/HMC.
- Dr. Fawad Rahim Department of Medicine KGMC/HMC.

Behavioral Sciences:

- Dr. Ameer Abbas Department of Psychiatry KGMC/HMC.

Medical Education

- Dr. Naheed Mahsood, Department of Medical Education, KGMC.

- Dr. Naveed Afzal Khan, Department of Medical Education, KGMC.
- Dr Onaiza Nasim , Department of Medical Education, KGMC

Basic Sciences:

- Dr. Amin-ul-Haq Department of Biochemistry, KGMC.
- Dr. Khalid Javed Department of Pathology, KGMC.
- Dr. Raheela Amin Department of Community Medicine, KGMC.
- Dr. Zubia Shah Department of Physiology, KGMC.
- Dr. Naheed Siddique Department of Forensic Medicine, KGMC.
- Dr. Shams Suleman Department of Pharmacology, KGMC.
- Dr. Shahab-ud-Din, Department of Anatomy, KGMC.

Module Committee for Endocrinology

Endocrine System

1. Dr. Sarah Shahid Lecturer Department of **Physiology**..... **Module Coordinator**
2. Dr. Naheed Mehsood Assistant Professor **DME** .....**Module Secretory**:
3. Dr. Naveed Afzal Khan Coordinator **DME** .....**Module Secretory**
4. Dr Onaiza Nasim **DME** ..... **Module Coordinator.**
5. Dr. Shabnam Gul Associate **Admin**.....**Member**:
6. Dr. Shakeela Asif Associate Professor Department of **Community Medicine**...**Member**
7. Dr. Muhammad Hussain Afridi Assistant Professor Department of **Endocrinology**...**Member**
8. Dr. Saima Nadeem Assistant Professor Department of **Pathology**..... **Member**
9. Dr. Ameer Abbas Assistant Professor Department of **Behavioral Sciences**...**Member**
10. Dr. Yousaf Jan Assistant Professor Department of **Surgical B** ....**Member**
11. Dr. Afsheen Mehmood Assistant Professor Department of **Physiology**.....**Member**
12. Dr. Gulnaz begun Senior Lecturer Department of **Biochemistry**..... **Member**
13. Dr. Fahad Falah Lecturer Department of **Pharmacology**.....**Member**
14. Dr. Faiza Nadeem Lecturer Department of **Forensic Medicine**.....**Member**
15. Dr. Qaisar Zaman, Lecturer **Anatomy**. .....**Member**:
16. Dr. Farida Ahmad Lecturer **Physiology**.....**Member**
17. Miss. Faryal Alam **Student of Final Year**.....**Member**
18. Miss. Faiza Gul **Student of Final Year**.....**Member**

Integrated curriculum:

An integrated curriculum is all about making connections, whether to real life or across the disciplines, about skills or about knowledge. An integrated curriculum fuses subject areas, experiences, and real-life knowledge together to make a more fulfilling and tangible learning environment for students. 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 are characteristics of integrated teaching program.

Outcomes of the curriculum:

The outcomes of the curriculum of MBBS According to the PMDC are as follows

- Knowledgeable
- Skilful
- Community Heath Promoter
- Problem-solver
- Professional
- Researcher
- Leader and Role Model

KNOWLEDGE

By the end of five year MBBS program the KGMC student should be able to;

1. Acquire a high level of clinical proficiency in history taking, physical examination, differential diagnosis, and the effective use of medicine's evolving diagnostic and procedural capabilities including therapeutic and palliative modalities
2. Manage the common prevalent diseases in community
3. Identify the common medical emergencies
4. Develop plan for prevention of common community diseases
5. Formulate a referral plan
6. Compose a prescription plan

PSYCHOMOTOR

By the end of five year MBBS program the KGMC student should be able to;

1. Demonstrate the ability to perform the disease specific relevant examination
2. Respond to common medical emergencies
3. Master the skill of first aid
4. Perform BLS
5. Apply the best evidenced practices for local health problem

AFFECTIVE

By the end of five year MBBS program the KGMC student should be able to

1. Relate to patient and careers vulnerability
2. Demonstrate ethical self-management
3. Counsel and educate patients and their families to empower them to participate in their care and enable shared decision-making.
4. Display compassion with patient and colleagues
5. Demonstrate in clinical care an understanding of the impact of psychological, social, and economic factors on human health and disease

Introduction to endocrine system

The Endocrine System is composed of glands that secrete chemicals called hormones into the bloodstream for the control of body functions. ... Substances released by the hypothalamus trigger the production and secretion of hormones by the pituitary gland. The endocrine system uses chemical messages in the form of hormones- chemical substances that are secreted by cells into extracellular fluids and regulate metabolic activity. Blood transfers hormones to target sites. Target cells or target organs Target cells must have specific protein receptor in order to be affected by the hormones.

Hormones of the endocrine system coordinate and control growth, metabolism, temperature regulation, the stress response, reproduction, and many other functions.

General Learning Outcomes of Course

Knowledge

- Development, structure, hormones and regulation of pituitary gland, thyroid gland, parathyroid gland, endocrine pancreas, and adrenal glands
- Describe the etiology, pathophysiology, relevant clinical features and common investigations of disorders of these glands
- Describe the basic concepts and components of medical professionalism

Skills

- Describe the steps of writing a research proposal
- Detect glucose in urine
- Detect glucose in blood
- Perform and interpret Glucose
- tolerance test
- Identify the structure of pituitary gland
- under microscope
- Identify the structure of thyroid gland under microscope
- Identify the structure of adrenal gland under microscope

Affective

Demonstrate compassion and care for patients while performing any examination
Demonstrate the team work while working in the hospital environment.
Show good communication skills while performing tasks.

List of Themes …….TOTAL WEEKS-4

Themes ……. Duration in weeks

Tall stature…… 1 week

Neck swelling with bulging eyes tetany ……..1 week

Increased thirst and urination…….. 1 week

Moon face ……..3 days

Subject	Topic		Learning objectives	MIT	Assessment
Embryology	Pituitary gland	1	Describe the development of Anterior and posterior pituitary gland	LGF	Mcq/Seq
Histology	Pituitary gland	2	Enlist the histological differences between anterior and posterior pituitary glands	LGF	Mcq/Seq
Physiology	Introduction to endocrinology	3	Describe the chemical messengers in the body	LGF	Mcq/Seq
		4	Describe the classification of hormones	LGF	Mcq/Seq
		5	Describe mechanisms of synthesis of hormones	LGF	Mcq/Seq
		6	Describe mechanisms of hormone Secretion, Transport and Clearance from the Blood	LGF	Mcq/Seq
	Mechanisms of Action of Hormones	7	Explain mechanisms of Action of Hormones	LGF	Mcq/Seq
		8	Describe second messenger mechanisms for mediating intracellular hormonal functions	LGF	Mcq/Seq

		9	Describe measurement of Hormone Concentrations in the Blood	LGF	Mcq/Seq
	Pituitary gland Physio-logical anat-omy and its	10	Describe physiological anatomy of pituitary gland	LGF	Mcq/Seq
		11	Describe hypothalamus Control of Pituitary Secretion	LGF	Mcq/Seq
	Physiological Functions	12	Describe Growth hormone's effect on growth and metabolism	LGF	Mcq/Seq
		13	Explain the structure, mechanism of action and physiological effects of Insulin-Like Growth Factors	LGF	Mcq/Seq
		14	Describe regulation of Growth Hormone	LGF	Mcq/Seq

	Physiological Functions of Posterior Pitui-	15	Describe formation and physiological functions of Oxytocin	LGF	Mcq/Seq
		16	Describe formation and physiological functions of ADH	LGF	Mcq/Seq
Biochemistry	Hormones Introduction	17	Define hormones and differentiate between the terms- endocrine, paracrine & autocrine	LGF	Mcq/Seq
		18	Classify hormones on various basis	LGF	Mcq/Seq
		19	Discuss the mechanisms of action of hormones	LGF	Mcq/Seq
		20	Define 2nd messengers and their roles	LGF	Mcq/Seq
	Anterior Pitui-tary hormones	21	Enumerate the hormones of anterior pituitary gland	LGF	Mcq/Seq
		22	Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of Growth hormone with its related clinical disorders	LGF	Mcq/Seq
	Posterior Pitui-tary hormones	23	Enumerate the hormones of the posterior pituitary gland	LGF	Mcq/Seq

		24	Describe the chemistry, secretion, mechanism of action, regulation and metabolic effects of the hormones of the posterior pituitary gland with its related clinical disorders	LGF	Mcq/Seq
Medicine	Acromegaly	25	Describe the pathophysiology, clinical features and investigations of patient with Acromegaly and Gigantism	LGF	Mcq/Seq
		26	Describe the etiology, clinical features and investigations of a patient with diabetes insipidus	LGF	Mcq/Seq
Neurosurgery	Tumors of pituitary gland	27	Explain the types, clinical features, CT and MRI findings and management of pituitary tumors	LGF	Mcq/Seq
Pediatrics	Growth charts	28	Describe the fundamentals of growth charts in pediatric practices	LGF	Mcq/Seq
Theme-2 (Neck swelling with bulging eyes and Tetany)					
Gross anatomy	Thyroid gland	29	Describe the gross structure, lobes, relations, bold supply, venous drainage, nerve supply and lymphatic drainage of thyroid gland	Dissection/Demo	Mcq/Seq
Embryology	Thyroid gland	30	Describe the developmental events and anomalies of thyroid gland	LGF	Mcq/Seq

	Parathyroid gland	31	Describe the developmental events of parathyroid gland and its anomalies	LGF	Mcq/Seq
Histology	Thyroid gland	32	Describe the microscopic structure of thyroid gland	LGF	Mcq/Seq
Physiology	Introduction of thyroid hormones	33	Describe formation, Secretion and transport of thyroid hormones	LGF	Mcq/Seq
		34	Explain mechanism of action of thyroid hormones	LGF	Mcq/Seq
		35	Explain the actions of thyroid hormones on cellular metabolism	LGF	Mcq/Seq
	Physiological functions &regulation of	36	Describe Physiological effects of Thyroid Hormone on Growth, metabolism and body systems	LGF	Mcq/Seq
		37	Describe Regulation of Thyroid Hormone Secretion	LGF	Mcq/Seq

	Physiologi-cal functions and Control of the Para-thyroid hormone	38	Explain Mechanism of action PTH Secretion	LGF	Mcq/Seq
		39	Describe Effect of Parathyroid Hor-mone on Calcium and Phosphate concentrations	LGF	Mcq/Seq
		40	Describe Control of Parathyroid	LGF	Mcq/Seq
	Physiological role of VIT D and Calci-tonin in Calcium metabolism	41	Explain Role of Vit. D in Calcium and phosphorus metabolism	LGF	Mcq/Seq
		42	Explain physiological functions of calcitonin	LGF	Mcq/Seq
Biochemistry	Thyroid gland	43	Enumerate the hormones secreted from thyroid gland	LGF	Mcq/Seq

		44	Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of thyroid hormone and calcitonin with its related clinical disorders	LGF	Mcq/Seq
	Parathyroid gland	45	Enumerate the hormones secreted from parathyroid gland	LGF	Mcq/Seq
		46	Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of parathyroid hormone with its related clinical disorders	LGF	Mcq/Seq
Medicine	Thyroid disorders	47	Explain the clinical features of hyperthyroidism	LGF	Mcq/Seq
		48	Explain the clinical features of hypothyroidism	LGF	Mcq/Seq

Pharmacology	Antithyroid drugs	49	Describe the types and mechanism of action of Antithyroid drugs	LGF	Mcq/Seq
Community medicine	Diabetes mellitus	50	Describe the epidemiology, risk factors and prevention of Diabetes Mellitus	LGF	Mcq/Seq
Theme-3 (Increased thirst and urination)					
Histology	Pancreas	51	Describe the histological features of pancreas and differentiate between exocrine and endocrine parts of pancreas	LGF	Mcq/Seq
Physiology	Mechanism of action of insulin &its control	52	Explain Mechanism of action of insulin	LGF	Mcq/Seq
		53	Describe the Control of Insulin Secretion	LGF	Mcq/Seq
	Physiological Ef-fects of insulin on carbohydrates, protein, and Fats	54	Describe the effects of insulin on carbohydrates, proteins and Fats metabolism	LGF	Mcq/Seq
	Physiology of Glucagon	55	Describe regulation of glucagon and its effects	LGF	Mcq/Seq

		56	Describe the physiological actions of Somatostatins	LGF	Mcq/Seq
	Physiological effects of Diabetes	57	Describe Effects of hyperglycaemia /hypoglycaemia on body functions	LGF	Mcq/Seq
		58	Explain Insulin resistance	LGF	Mcq/Seq
Biochemistry	Pancreas	59	Enumerate the hormones secreted by pancreas	LGF	Mcq/Seq
		60	Describe the chemistry, biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Insulin & Glucagon with its related clinical disorders	LGF	Mcq/Seq
Pharmacology	Antidiabetic drugs	61	Explain the mechanism of action of oral antidiabetic drugs	LGF	Mcq/Seq
		62	Explain the mechanism of action and complications of Insulin therapy	LGF	Mcq/Seq

Medicine	Diabetes Mellitus	63	Explain the short-term and long-term complications of Diabetes Mellitus	LGF	Mcq/Seq
		64	Describe the pathophysiology, clinical features and treatment of Diabetes Mellitus	LGF	Mcq/Seq
Theme-4 (Moon face)					
Gross anatomy		65	Describe the gross anatomy and relations of adrenal glands on both sides	LGF	Mcq/Seq
Embryology	Adrenal gland	66	Describe the development of adrenal gland	LGF	Mcq/Seq
Histology		67	Describe the microscopic picture of adrenal gland and differentiate between the various histological zones of adrenal gland	LGF	Mcq/Seq
Physiology	Physiological functions of Al-	68	Describe Types, Mechanisms and regulation of mineralocorticoids	LGF	Mcq/Seq
		69	Describe the physiological Effects of Aldosterone (Renal, Circulatory and others)	LGF	Mcq/Seq

	Physiological Functions of the Glucocorti-	70	Describe Types and Mechanisms of Glucocorticoids actions	LGF	Mcq/Seq
		71	Describe Effects of Cortisol on Carbohydrate, Proteins and Fat Metabolism	LGF	Mcq/Seq
		72	Describe role of Cortisol in Stress, Inflammation and Allergy	LGF	Mcq/Seq
	Physiological functions Adrenocorticotropic Hormone ACTH	73	Describe ACTH Secretion & mechanism of Action	LGF	Mcq/Seq
Biochemistry	Adrenal cortical hormones	74	Enumerate the hormones secreted from adrenal cortex	LGF	Mcq/Seq
		75	Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal cortical hormones with its related clinical disorders	LGF	Mcq/Seq

	Adrenal medullary hormones	76	Enumerate the hormones secreted from adrenal medulla	LGF	Mcq/Seq
		77	Describe biosynthesis, secretion, mechanism of action, regulation and metabolic effects of Adrenal medullary hormones with its related clinical dis-orders	LGF	Mcq/Seq
		78	Describe the structure and functions of Melanocyte-Stimulating Hormone, Lip-otropin, and Endorphins	LGF	Mcq/Seq
Medicine	Cushing`s syndrome	79	Describe the clinical features and complications of Cushing`s syndrome	LGF	Mcq/Seq
	Addison`s disease	80	Describe the clinical features and complications of Addison`s disease	LGF	Mcq/Seq

Practical work

Biochemistry	Urinary glucose	81	Detect glucose in urine	practical	Mcq/Seq
	Blood glucose	82	Detect glucose in blood	practical	Mcq/Seq
	Glucose tolerance test	83	Perform and interpret Glucose tolerance test	practical	Mcq/Seq
Histology	Pituitary glands	84	Identify the structure of pituitary gland under microscope	practical	Mcq/Seq
	Thyroid gland	85	Identify the structure of thyroid gland under microscope	practical	Mcq/Seq
	Adrenal gland	86	Identify the structure of adrenal gland under microscope	practical	Mcq/Seq

Teaching and learning strategies:

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

- Interactive Lectures
- Hospital / Clinic visits
- Small Group Discussion
- Skills session
- Self-Directed Study

Interactive lectures:

An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture-based class of any size. Interactive lectures are classes in which the instructor breaks the lecture at least once per class to have students participate in an activity that lets them work directly with the material.

- The instructor might begin the interactive segment with an engagement trigger that captures and maintains student attention.

- Then the instructor incorporates an activity that allows students to apply what they have learned or give them a context for upcoming lecture material.
- As the instructor feels more comfortable using interactive techniques he or she might begin to call upon a blend of various interactive techniques all in one class period.

Hospital / Clinic 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 (SGD):

The shy and less articulate are more able to contribute. Students learn from each other. Everyone gets more practice at expressing their ideas. A two way discussion is almost always more creative than individual thoughts. Social skills are practiced in a 'safe' environment e.g. tolerance, cooperation. This format helps students to clarify concepts acquire skills or attitudes. 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.

Skills/Practical session:

Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Laboratories of various departments.

Self-Directed learning (SDL):

Self-directed learning, which involves studying without direct supervision in a classroom/Library, is a valuable way to learn and is quickly growing in popularity among parents and students. Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

Time tables:

The timetables for the module will be shared via Edmodo and the notice boards in advance.

Assessment tools:

Theoretical knowledge is tested by a written examination system constituted by multiple choice questions (MCQs). The assessment of practical knowledge involves oral, spot, or objective structured practical examinations (OSPE).

Multiple Choice Questions (MCQs):

- Multiple choice questions (MCQs) are a form of assessment for which students are asked to select the best choice from a list of answers.
- MCQ consists of a stem and a set of options. The stem is usually the first part of the assessment that presents the question as a problem to be solved; the question can be an incomplete statement which requires to be completed and can include a graph, a picture or any other relevant information. The options are the possible answers that the student can choose from, with the correct answer called the key and the incorrect answers called distractors.
- Correct answer carries one mark, and incorrect 'zero mark'. There is NO negative marking.
- Students mark their responses on specified computer-based sheet designed for the college.
- The block exam will comprise of 120 MCQs and will be compiled according to the shared blueprint.

Short Essay Questions (SEQ)

Short answer questions generally ask for brief, text-based responses and may also be referred to as *fill-in-the-blank*; or *completion* questions.

Variations of the short answer question may request a list of terms or rules in which the order is not important, or may require a numerical or formula response.

Here is some general information about short answer questions:

- Does not measure interpretation.
- Can be used to check for preciseness such as correct spelling (good when using computer grading), proper or specific names of things, especially factual knowledge, and proper creation of formulas.
- Requires specific, definite, exact information.
- Can be used to discriminate whether errors can be detected in a diagram, for example.

Advantages of Short Answer Questions

- Easy to write.
- Reduces possibility of guessing.
- Can have a lengthy stem such as a paragraph. (Caution: You generally should not expect an exact answer character-by-character.)
- May be easy to score if the required answer is short.

Disadvantages of Short Answer Questions

- It can take time to create items with complex formulas.
- Can be turned into a measure of memorization ability.
- Grading can be subjective.
- Correct responses may appear incorrect due to minor errors such as misspellings, order of words, etc.
- Difficult to machine score. Much work is being conducted in this area, but it is still in early stages of development.

Objective Structured Practical Examination (OSPE)

- The content may assess application of knowledge, or practical skills.
- Student will complete task in define time at one given station.
- All the students are assessed on the same content by the same examiner in the same allocated time.
- A structured examination will have 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 students will have to answer the questions related to the given pictures, models or specimens the provided response sheet.
- Rest station is a station where there is no task given, and in this time student can organize his/her thoughts.
- The Block OSPE will be comprise of 18 examined station and 7 rest stations. The stations will be assigned according to the shred blueprint.

Internal Evaluation:

Internal evaluation is a process of quality review undertaken within an institution for its own ends. 10% marks of internal evaluation will be added to final marks. This 10% will be based on

Distribution of 12 Marks for block F paper	
Marks obtained	**Average of Percentage in Block exam and Pre-Professional exam.**

Distribution of 12 Marks for Block F OSCE/OSPE	
Marks obtained	**Average of percentage in Block OSPE Exam and Block Pre-Prof OSPE**
	Practical copies

Attendance Requirement:

More than 75% attendance is mandatory to sit for the examinations.

Learning resources for students

Anatomy

- Snell Neuroanatomy
- B.D Churasia
- Nelter Atlas
- Langman embryology
- Keithalmore embryology
- Laiq Hassain Basic Histology
- Difore Atlas Histology

Physiology

- Guyton nd Hall physiology
- Ganong physiology
- Human Physiology from cells to system by lauralee sherwood
- BRS Physiology
- Neuroscience by Dale Purves

Biochemistry

- Chatterjee text book of Biochemistry
- Harpers Biochemistry
- Lippincotts Biochemistry
- Satya Narayan biochemistry

Apart from this resource learning, students can consult books available in library or recommended by the specialty experts.