



MISSION

Our mission is to educate and produce exemplary doctors who practice ethical patient centered health care, discover and advance knowledge and are responsive to the community needs.

VISION

To produce competent doctors equipped with sound knowledge based on scientific principles, imbued with ethics and moral values primed to serve the community through the profession.

Our aim is to

- Provide outstanding educational environment for medical students.
- Develop exemplary clinicians who are lifelong learners and provide the highest quality compassionate care and serve the needs of their community and the nation in the best traditions of medical profession.
- Ensure the highest ethical and professional standards in all of our deeds.

Exit Outcomes for the CKMC Graduate

Knowledge

- Integrate knowledge of basic and clinical sciences in disease prevention and promotion of health and well-being of community.
- Able to appraise varied information they would come across during professional work and testify innovative ideas to benefit human society through evidence-based health care practice
- Demonstrate scientific knowledge in all professional activities
- Demonstrate research skills which bring innovation and significance to health care practices.

Skills

- Able to perform physical examinations, formulate provisional diagnosis with appropriate investigations to identify specific problems.
- Perform various common procedures to diagnose and manage non critical clinical problems.
- Demonstrate competency in life saving procedures.
- Exhibit propensity of critical thinking, problem solving and lifelong self-directed learning skills.

Attitude

- Manifest ethical values and professionalism.
- Demonstrate professional attitude towards patients, their families, seniors and colleagues.
- Demonstrate dedication and professionalism when faced natural disasters in country.
- Demonstrate communication skills, inter professional skills and leadership.

knowledge	Skill	Attitude
Integrated knowledge of basic & clinical sciences	Communication skills	Ethical values
Patient centered care	Research skills	
Health promotion & disease prevention	Patient management skills	Professionalism
Community needs	Leadership skills	
	Critical thinking skills	

Introduction to the Study Guide

Dear Students,

We, at the Department of Medical Education, CMH Kharian Medical College, have developed this study guide especially for you. This study guide is an aid to

- Inform you how this part of your syllabus has been organized.
- Inform you how your learning programs have been organized in this block.
- Help you organize and manage your studies throughout the block
- Guide you on assessment methods, rules and regulations.
- Communicate information on organization and management of the block. This will help you to contact the right person in case of any difficulty.
- Define the objectives which are expected to be achieved at the end of the block.
- Identify the learning strategies such as lectures, small group discussions, clinical skills, demonstration, tutorial and case-based learning that will be implemented to achieve the block objectives.
- Provide a list of learning resources such as books, and journals for students to consult in order to maximize their learning.

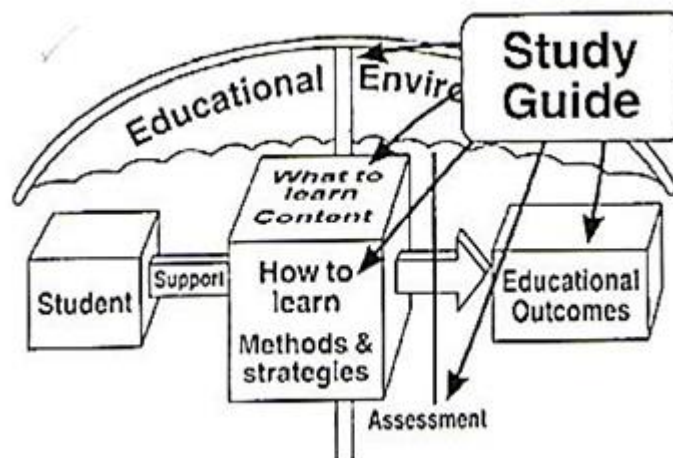


Figure 1 Objectives of study guide by Harden

Curriculum Integration



Medical college curriculum shall be organized in blocks of modules. The modules are named after body system for example a module of blood in a block. The key details are as follows:

1. There shall be three blocks in first year MBBS comprising modules.
2. The blocks shall be labeled as 1, 2 and 3.
3. Each module in a block shall have a title. The name of the module shall represent the content taught and learned the majority of time in that module. Module shall be named after body systems.
4. The duration of three blocks shall vary between 8–11 weeks according to syllabus.
5. The syllabus shall be integrated horizontally around systems of the body.
6. There shall be vertical integration to the extent decided by the curriculum coordination committee.
7. Vertical integration shall be in case based learning sessions and in clinical lectures of basic sciences, scheduled in the structured training program.

Teaching and Learning Methods

1: Small Group Discussions (SGD)

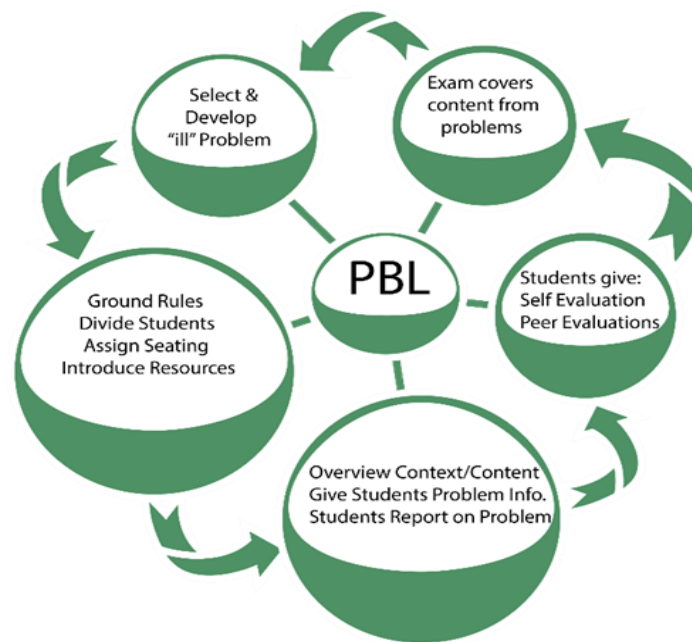


The topic will be taught in groups with the help of models and audiovisual aids. Pre-planned topics would help students to combine their wisdom in achieve learning objectives. Facilitator would be guiding to achieve learning objectives and making them on right track by clarify any misconception.

“Small group learning provides more active learning, better retention, higher satisfaction, and facilitates development of problem-solving and team-working abilities (Jahan, Siddiqui, AlKhouri, Ahuja, & AlWard, 2016).

2: Problem Based Learning (PBL)

This is group learning comprising of 8-10 students guided by a facilitator. For a specific problem given to students two sessions of 2 hours would be scheduled to achieve the learning objectives. In the first session students will discuss problem based upon their existing knowledge among the group and will produce a list of their learning objectives for further study. In the second session students share, discuss with each other to build new knowledge.



PBL is a self-directed learning and that type of educational strategy most likely produce doctors who are prepared for lifelong learning and able to meet the changing needs of their patients (Spencer & Jordan, 1999).

3: Large Group Interactive Session (LGIS)



These are meant to give overview of certain course content. They should be interactive so that students can not only gain knowledge but should completely understand it. Students may clarify the difficult concepts in these sessions. The lecturer introduces a topic and explains the underlying

phenomena through questions, pictures, videos of patient's interviews, exercises, etc. Students are actively involved in the learning process.

4: Self Directed Learning (SDL)



In this modern era of medical education, students assume responsibilities of their own learning according to the principles of adult learning. They can study independently, can share and discuss with peers, can take information from the sources of information college have like library, internet and teachers. Students will be provided time within the scheduled college hours for self-study.

5: Hands on Training

- **Lab session**



Histology, biochemistry, physiology practical will build skills in identification of normal histology of human body tissues. There would be test of these skills in OSPE exam.

- **Clinical Rotations**



The students will rotate in the clinical departments to see integration of knowledge into clinical practices.

Teaching and learning activities are meant to help students to gain new knowledge. It should be kept in mind that they are not meant to fully cover the objectives of the subject. It is therefore responsibility of students to attain more information to cover all objectives given in the overall objectives.

Class attendance and participation is of most important in gaining knowledge. If any help is needed module team can be contacted without any hesitation. Attendance will be strictly checked in different teaching activities. If attendance is **less than 75%**, students would not be allowed to sit for the examination.

Attendance in the examination is must and no students would be allowed to enter the examination area after starting the examination. In case of sickness, sick leaves from government/private hospitals or the emergency of the college hospital will only be entertained.

Assessment Format

Assessment is a goal-oriented process (Angelo, 1995). We assess in order to check whether the learning objectives set at the initiation of the program are met or not and to what extent (Amin,

2007).

No student will be allowed to sit in the annual examination if attendance is below 75% in theory and practical separately.

Assessment types

The assessment will be continuous. The purpose of continuous assessment is formative and summative.

Summative Assessment:

The marks of this type of assessment contribute in the final university result through internal assessment. It comprises:

- CBL/tutorial assessment
- Scheduled tests
- Sub-stages
- End of block exam
- Pre-annual exam

Scheduled tests and sub-stages will be conducted intermittently throughout the block. Their schedule will be intimated through the time tables.

The end of the block exam will be conducted after completion of weeks of instruction. It will comprise one theory paper and one practical exam for Anatomy, Physiology and Biochemistry. (Table of specifications (TOS) for exam has been provided)

Formative Assessment: Tests may be quizzes, surprise tests/written assignments/self-reflection by students during the teaching time but their marks will not be added to internal evaluation marks. The purpose of formative assessment is to provide feedback to the students, for the purpose of improvement and to teachers to identify areas where students need further guidance.

Internal Assessment

(Will be submitted to the university before professional exam)

- The weightage of internal assessment shall be 10 % in theory paper and 10 % in practical, in the annual professional examination (or 10 marks for 100 marks in theory and practical each)
- Scheduled tests, sub-stages, CBLs/tutorials, block examinations and pre-annual examinations, conducted by the college shall contribute towards internal assessment for professional examination.

Annual Professional Examination:

- The professional examinations schedule will be provided by NUMS.
- There will be two components of the final result
 - (i) Examination-80 % (ii) Internal Assessment- 20 %
- There will be one theory paper and one Practical exam for Anatomy, Physiology and Biochemistry each. For practical the class will be divided into batches. Each batch will have practical exam of one subject on the specified day, according to schedule.
- Theory & Practical assessment shall be of 100 marks each in Anatomy, Physiology and Biochemistry, making a **total of 200 marks for each subject**.
- The Annual Theory paper shall be of 80 marks. 20 marks of internal assessment of theory papers, conducted throughout the year will be added to it, to make annual theory assessment of 100 marks. Similarly, the annual practical examination will be of 80 marks. 20 marks of internal evaluation of practical exams, conducted throughout the year will be added to it, to make annual practical assessment of 100 marks.
- The pass score shall be 50 out of 100, in theory and practical separately.

Schedule of examinations:

a) Continuous assessments schedule

Schedule provided by each department in Time table.

b) Formative tests: Throughout the block

Block Development Committee

Chairperson curriculum committee	Principal Brig (Retd) Shoaib Nayyar Hashmi
Director Medical education	Dr Aasma Qaiser
Block Planner	Dr Aasma Qaiser
Resource Persons	Anatomy: Prof. Irfan Qadir Physiology: Dr Aiman Farogh Anjum Biochemistry: Prof. Dr. Aleem Ul Haq Medicine: Maj Usman Surgery: Dr Waqas
Study Guide Developed By	Department of Medical Education CMH Kharian Medical College Kharian

Structured Summery of Y2B3

Block Code	Y2B3
Pre requisite Block	Y2B2
Duration	10 weeks
Rationale	The Y2B3 block is taught as the third block after the students clear their first professional exam. In a period of 8 weeks, the block aims to form a basis for knowledge and skills related to the Neuroscience, brain . The concepts taught to the students in this block will help to lay a foundation for their knowledge of Neuroanatomy.
Anatomy	Gross anatomy Head and Neck Embryology Development of Head and Neck, Eye, Ear, Integumentary System Histology Lip and tongue, Salivary glands ,Endocrine glands, Eye, Ear ,Integumentary system
Physiology	Special Senses Physiology
Biochemistry	Hormones, Lipids, Metabolic pathways



Learning Outcomes

Knowledge

- Describe the gross anatomical features of Cerebrum, Midbrain, Pons, Medulla and Spinal cord
- Describe the sensory and motor parts of nervous system
- Describe the major levels of central nervous system along with their functions
- Describe the integrative function of nervous system
- Describe the blood cerebrospinal fluid and blood brain barriers
- Describe the structure of Nerve and explain the myelination of nerve fiber
- Describe the ascending and descending tracts of brain stem
- Describe analgesia system in brain & spinal cord
- Describe the mechanism of consolidation of memory
- Describe the functions of autonomic nervous system
- Explain the Physiology, anatomy and pathogenesis of Head & neck and special sense problems.
- Apply basic sciences to understand the causes of common Head & neck and special sense problems.
- Explain the structural & developmental organization of GIT.

	<ul style="list-style-type: none"> • Explain the composition, functions, mechanism & control of following gastrointestinal secretions: salivary, gastric, pancreatic, biliary, small & large intestines. • Describe the mechanism of absorption of various nutrients and their role in malabsorption syndrome. • Explain the physiological anatomy, biochemistry functions and dysfunctions of Liver. • Explain the GIT hormones (structure, function) & their role in secretion and motility. • Describe the chemical nature, biosynthesis and the physiological functions of hormones on their target organs.
<p>Skill</p>	<ul style="list-style-type: none"> • Draw a labeled diagram of the identified structures with the help of eosin and hematoxylin pencils on the histology notebooks • Mark the main anatomical land marks on skull • Dissect various parts of head and neck and special senses, and related structure • Demonstrate their gross Anatomy and relationship to each other. • Identify the histological features of all the endocrine glands under microscope. • To perform all the steps of blood glucose estimation in the lab. • Dissect various parts of GIT, and related structures including peritoneum, to demonstrate their gross Anatomy and relationship to each other. • Identify different organs of GIT under microscope and on model.

Attitude

- Demonstrate the effective attitude towards the colleagues
- Demonstrate a professional attitude, team building spirit and good communication skills
- Observe lab safety rules

Course content:

2nd YEAR MBBS

Block 3 CODE Y2B3

In case of online classes MIT and Assessment will be online via zoom meeting and Google classroom

Anatomy

Learning outcomes:

By the end of this block, the student should be able to:

- Elucidate the topographic anatomy of bones of skull, muscles of face and neck & joints of Head and Neck to deal with the common musculoskeletal conditions e.g. fractures and dislocations in future.
- Appraise the concepts of topographic anatomy of neurovascular components of Head and Neck to deal with the common neurovascular diseases/injuries in clinical practice.
- Apply the knowledge and skill gained through dissection of cadavers & study of prosected specimens of Head and Neck so as to learn the surgical procedures in future.
- Appraise the embryological basis of common congenital anomalies related with development of Head and Neck ,eye, ear and integumentary system
- Recognize the normal histomorphological features of various endocrine glands in the body, eye, ear, lip and tongue, salivary glands and the integumentary system to identify common histopathological conditions associated with these structures in future.

EMBRYOLOGY

S No.	Learning objectives:	MIT	Mode of assessment
1.	List embryological sources of head and neck structures	Online LGIS (G- Classroom & Zoom)	Theory/ Viva Voce/OSPE
2.	List components of pharyngeal apparatus	“	“
3.	Tabulate the nerve supply and derivatives of arches, pouches, clefts and membranes	“	“
4.	Describe the embryological basis of first arch syndrome and its relation to cardiac anomalies	“	“
5.	Correlate the normal development of tongue with its congenital anomalies	“	“
6.	Correlate the normal development and descent of thyroid gland with its associated anomalies.	“	“
7.	Justify the anatomical location of parathyroid with its development	“	“
8.	Outline the development of nose and paranasal sinuses	“	“
9.	Enumerate the prominences	“	“

	of fascial development.		
10.	Elucidate the embryological phenomenon of development of face and palate	“	“
11.	Correlate various facial and palatal clefts with normal development	“	“
12.	Describe the development of various layers of eyeball.	“	Theory/ viva voce
13.	Revisit the role of first and second pharyngeal apparatus in development of ear.	“	“
14.	Describe the differentiation of otic capsule into inner ear	“	“
15.	Correlate the anomalies of external ear with neural crest cells	“	“
16.	Describe the development of skin, hair, nails, mammary gland	“	“
17.	Analyze the embryological basis of relevant congenital anomalies like vitiligo, ichthyoses, hemangioma , dermatoglyphics, mammary gland.	“	“

HISTOLOGY

S No.	Learning objectives:	MIT	Mode of assessment
1.	Describe the histological features of lip, with emphasis on transition in structure from cutaneous to vermillion to mucosal zone.	Online LGIS (G- Classroom & Zoom)	Theory/ Viva voce /OSPE
2.	Explain the histological features of dorsal and ventral surfaces of tongue, with focus on tongue papillae, their shape, location, keratinization, number and presence or absence of taste buds.	“	“
3.	Describe the histological features of lip, with emphasis on transition in structure from cutaneous to vermillion to mucosal zone.	“	“
4.	Summarize the classification of salivary glands on basis of morphology and nature of secretion.	“	“
5.	Describe the histomorphological features of salivary glands with	“	“

	regards to their secretory and ductal systems.		
6.	Describe the various parts of pituitary gland.	“	“
7.	Identify and understand the cells forming the parenchyma of different parts of adenohypophysis, their staining characteristics, cellular features, and the hormones produced by them.	“	“
8.	Describe the histological differences between adenohypophysis and neurohypophysis on the basis of embryological origin, and understand the concept of Herring bodies and the hormones contained within them.	“	“
9.	Describe the histological structure of adrenal gland as an endocrine gland, with special focus on structure of various zones as regards the types of cells and their arrangements and the hormones produced by each zone.	“	“

10.	Describe the histological structure and hormones produced by the thyroid and parathyroid glands.	“	“
11.	Describe the detailed structure and function of sclera and cornea, with special emphasis on corneal transparency and its fusion with sclera at corneoscleral junction.	“	“
12.	Describe the light and ultramicroscopic structure of uveal tract, different layers of retina, correlating the arrangement of neuronal cells and processes with their functions	“	“
13.	Describe and correlate the gross anatomical structure of eyelid with its histological structure	“	“
14.	Identify and understand the histological structure of different parts of ear, particularly the external and internal ear.	“	“
15.	Describe the histological structure of sensory receptor areas of internal ear like	“	“

	Organ of Corti, maculae acousticae and crista ampullaris		
16.	Describe the components of skin, its epithelium (including the various cells of epidermis along with their functions), nail, hair and mammary gland.	“	“
17.	Explain histological differences between thick and thin skin.	“	“
18.	Describe the various appendages of skin.	“	“
19.	Describe the histological basis of psoriasis, vitiligo, albinism, blister disorders and cancers of skin.	“	“
20.	Describe the differences in histological structure of mammary gland between inactive, active and lactating phase.	“	“
21.	Describe the involution of mammary gland in old age.	“	“
22.	Describe the histological basis of carcinoma of mammary gland (part of parenchyma mostly	“	“

	involved- intraductal carcinoma).		
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GROSS ANATOMY			
S No.	Learning objectives:	MIT	Mode of assessment
1.	Appraise the general plan of studying skull from different views.	Online SGD (Narrated videos, 3-D atlas, G- Classroom & Zoom)	Viva voce
2.	Identify important bony landmarks on the bones as viewed from lateral, superior, inferior, anterior and posterior views.	“	“
3.	List structures traversing the foramina in these bones	“	Theory/ Viva voce/OSPE
4.	Identify the bones forming the boundaries of orbit, nasal cavity. oral cavity, temporal, infratemporal fossa & pterygopalatinefossa on the given bone. (detail to be done with relevant topics)	“	“
5.	Identify parts of mandible	“	Viva voce
6.	Identify ramus and body of mandible with respect to its	“	“

	bony features and attachments.		
7.	Enlist structures that are in direct contact with mandible	“	Theory/ Viva voce
8.	Distinguish the features of each cervical vertebra.	“	“
9.	Enumerate structures passing through foramina	“	“
10.	Identify type and movements of atlantoaxial and atlantooccipital joints.	“	“
11.	Outline ligamentous attachments on cervical vertebrae	“	Viva Voce
12.	Appraise extent of scalp on model Enumerate layers of scalp in a sequential order	Online LGIS (G-Classroom & Zoom)	Theory/ Viva voce
13.	Correlate gross features of each layer with anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and shape of hematoma.	“	“
14.	Outline the characteristic features of facial skin.	“	“
15.	Elucidate the cutaneous innervation of face.	Online LGIS (G-Classroom & Zoom)	Viva Voce
16.	Group facial muscles according to the orifices	“	Theory/ Viva voce

	they are guarding.		
17.	Describe the nerve supply of muscles of facial expressions.	“	“
18.	Describe the course of arteries, veins, lymphatics and nerves of the face with the help of model.	“	viva voce/OSPE
19.	Correlate gross features of face with anatomical basis of danger area,	“	Theory/ viva voce
20.	Identify muscles of facial expressions	“	OSPE
21.	Illustrate the cutaneous innervation of face	“	Theory
22.	Summarize contents of superficial fascia of neck (platysma, external jugular vein)	“	Theory/ viva voce
23.	Illustrate cutaneous innervation of neck	“	“
24.	Enumerate the layers of deep cervical fascia.	“	“
25.	Trace the attachments of investing, pretracheal, carotid sheath and prevertebral layers of fascia.	“	“
26.	Identify various modifications and neck spaces formed by facial	“	“

	attachments.		
27.	Comprehend the clinical importance of neck spaces in spread of infection.	“	“
28.	Tabulate the attachments, nerve supply, actions of superficial and deep muscles of neck (sternocleidomastoid, suprahyoid, infrahyoid, suboccipital, prevertebral muscles,).	“	Theory
29.	Identify boundaries and contents of triangles of neck on model	“	OSPE
30.	Describe the origin, course and distribution of vessels and nerves of neck (cervical plexus, Ansa cervicalis, Common carotid artery, Internal jugular vein, subclavian vessels)	“	Theory/ viva voce
31.	Analyze a case of lesion to accessory, glossopharyngeal and vagus nerve on anatomical basis.	“	“
32.	Describe the clinical features of torticollis.	“	“
33.	Revisit boundaries of	“	Theory /OSPE

	submandibular triangle		
34.	Describe the parts, relations and neurovasculature of submandibular gland.	“	Theory/ viva voce
35.	Trace the routes of submandibular ganglion.	“	“
36.	Describe the distribution of submandibular ganglion	“	Theory/ Viva voce
37.	Correlate the anatomy of submandibular fascial space with Ludwig's angina	“	“
38.	List contents of parotid region	“	“
39.	Elucidate the surfaces, borders, shape, location, parts, relations and drainage of parotid gland	“	“
40.	Trace the pathway of autonomic supply of parotid gland.	“	“
41.	Enumerate structures embedded in parotid gland in a sequential order.	“	“
42.	Analyze anatomical basis of clinical presentation of mumps.	“	“
43.	Correlate the extracranial course of facial nerve with Bell's palsy	“	“

44.	Outline the type, articular surfaces, capsule, ligaments, supporting factors, movements and nerve supply of TMJ.	“	“
45.	Describe movements of TMJ with reference to axes and muscles producing them.	“	“
46.	Correlate a case of dislocation and reduction of TMJ with anatomical knowledge of TMJ	“	Theory/ Viva Voce
47.	Identify the location, boundaries, contents and communications of temporal and infratemporal fossa on a given model and skull.	“	OSPE
48.	Describe the course and distribution of mandibular nerve from origin to distribution	“	Theory/ Viva Voce
49.	Tabulate the attachments, actions and nerve supply of muscles of mastication.	“	“
50.	Trace location, various routes and distribution of otic ganglion	“	“

51.	Justify role of lateral pterygoid as a peripheral heart on anatomical basis of pterygoid venous plexus.	“	“
52.	Elucidate importance of pterygoid venous plexus in case of intracranial spread of infection to cavernous sinus.	“	“
53.	Trace origin and distribution of superficial temporal, First and second parts of maxillary artery	“	Theory/ Viva Voce/OSPE
54.	Trace origin and distribution of Chorda tympani from origin till it joins the lingual nerve.	“	Theory/ Viva voce
55.	Outline the floor, roof, lateral walls and vestibule of oral cavity.	“	“
56.	Describe topographic features of tongue.	“	“
57.	Tabulate the actions and nerve supply of muscles (intrinsic and extrinsic) of tongue	“	“
58.	Correlate the nerve supply of tongue with its embryological origin.	“	“

59.	Differentiate a case of UMN and LMN lesion of hypoglossal nerve	“	“
60.	Correlate Lymphatic drainage of different parts of tongue with spread of malignancy and infection of tongue.	“	“
61.	Tabulate the attachments, nerve supply, actions of muscles of soft palate.	“	“
62.	Describe the skeletal framework of different walls of nose	“	“
63.	Summarize the features, vascular supply, nerve supply and openings in lateral wall of nose	“	“
64.	Describe the features, vascular supply, nerve supply of medial wall of nose	“	“
65.	Highlight the significance of little's area in a case of epistaxis	“	“
66.	Trace the location and drainage of paranasal sinuses in skull and on radiograph	“	Viva voce/ OSPE

67.	Identify the location of pterygopalatine fossa on skull	“	Viva voce
68.	List bones forming walls of pterygopalatine fossa	“	Theory/ Viva voce
69.	Enumerate the contents and communications of pterygopalatine fossa	“	“
70.	Describe the distribution of third part of maxillary artery, maxillary nerve and pterygopalatine ganglion	“	Theory/ Viva voce
71.	Differentiate extent, anatomical features, vascular supply, nerve supply of three parts of pharynx on anatomical basis	“	“
72.	List muscles of pharynx with nerve supply and action	“	“
73.	Name structures passing through the spaces between muscles of pharynx	“	“
74.	Trace origin of pharyngobasilar fascia on base of skull.	“	Viva voce
75.	Correlate anatomical knowledge of pharyngobasilar fascia	“	Theory/ Viva voce

	with patency of nasopharynx		
76.	Justify role of Eustachian tube in equalizing middle ear pressure, age related obliquity	“	“
77.	Describe anatomical route of spread of infections from nasopharynx to middle ear.	“	“
78.	Relate boundaries of tonsillar fossa and tonsillar bed with significant structures that must be protected during tonsillectomy.	“	“
79.	Define Kilian's dehiscence.	“	“
80.	Describe laryngeal wall in detail with emphasis on cartilages, ligaments, muscles, vascular supply and nerve supply.	“	“
81.	Enlist paired & unpaired laryngeal cartilages and identify their gross features.	“	“
82.	Enlist intrinsic & extrinsic membranes of larynx identify their gross features & formation of vestibular and vocal ligaments.	“	“

83.	Analyze mechanism of abduction and adduction of vocal cords	“	“
84.	Distinguish clinical presentations of injury to external, internal and recurrent laryngeal nerves.	“	“
85.	Explain Clinical significance of piriform fossa	“	“
86.	Identify gross features of thyroid and parathyroid glands on models.	“	OSPE
87.	Describe capsule, relations and blood supply of thyroid and parathyroid gland	“	Theory/ Viva voce
88.	Justify anatomical basis of movement of thyroid gland during deglutition	“	“
89.	Comprehend surgical precautions in thyroid surgery while ligating vessels and enucleation	“	“
90.	Identify the anatomical basis of hoarseness of voice after thyroidectomy	“	“
91.	Enumerate the groups of lymph of nodes draining the neck and describe their	“	Theory/ Viva voce

	location and areas of drainage.		
92.	Describe the formation of jugular lymph trunk.	“	“
93.	Appraise the clinical importance of `lymphatic drainage of head and neck	“	“
94.	Describe the gross anatomical features of auricle, external auditory meatus and tympanic membrane.	“	“
95.	Correlate nerve supply of external ear and tympanic membrane	“	“
96.	Justify the anatomical basis of otoscopy in infants and adults	“	“
97.	Describe the gross anatomical features, boundaries, structures and contents of middle ear cavity.	“	“
98.	Describe the structures forming the walls of middle ear cavity on the given model.	“	OSPE
99.	Highlight the importance of infection in middle ear	“	Theory/ Viva voce

	cavity in relation to its communications.		
100.	Trace the pathway and distribution of facial nerve within petrous part of temporal bone.	“	“
101.	Describe the parts of bony and membranous parts of inner ear	“	“
102.	Identify the parts of bony and membranous parts of inner ear on model	“	OSPE
103.	Describe the course and distribution of facial nerve	“	Theory/ Viva voce
104.	Revisit the effects of lesion of facial nerve at different levels	“	“
105.	Differentiate anatomical basis of clinical presentation of UMN and LMN lesion of facial nerve	“	“
106.	Describe the skeletal framework of bony orbit and its communications	“	OSPE/ Viva voce
107.	List the contents of orbit	“	Theory/ Viva voce
108.	Identify the parts of eyeball on a model	“	OSPE
109.	Tabulate the attachments,	“	Theory

	nerve supply and actions of extraocular muscles		
110.	Justify the movements of extraocular muscles based on their attachments	“	Theory/ Viva voce
111.	Trace the course and distribution of 3, 4 and 6 CN.	“	“
112.	Justify the peculiar Position of eyeball in case of lesion of 3, 4 and 6 CN	“	“
113.	Trace the route and distribution of ciliary ganglion	“	“
114.	Describe the course and distribution of ophthalmic nerve	“	“
115.	Name different components of lacrimal apparatus	“	“
116.	Describe the nerve supply of Lacrimal gland	“	“
117.	Trace the intracranial and extracranial courses and distribution of all the cranial nerves	“	“
118.	Identify the important bony landmarks of cervical vertebrae, paranasal sinuses, skull on x ray.	“	OSPE

119.	<p>Mark following structures on subject</p> <p>a. Parotid Gland and duct</p> <p>b. Thyroid</p> <p>c. Common Carotid</p> <p>Artery</p> <p>d. External carotid artery</p> <p>e. Facial artery</p> <p>f. Vagus nerve</p> <p>g. Accessory nerve</p> <p>h. Hypoglossal nerve</p> <p>i. External jugular vein</p> <p>j. Internal jugular vein</p>	“	VIVA VOCE
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Surgical Anatomy			
S No.	Learning objectives:	MIT	Mode of assessment
120.	<ul style="list-style-type: none"> • Demonstrate understanding of basic concepts • Justify the clinical presentation with reasoning regarding the following topics: <ul style="list-style-type: none"> ✓ Face trauma ✓ Danger area of face ✓ Impacted stones in salivary glands ✓ Freys syndrome ✓ Epistaxis ✓ Scalp injuries 	Online LGIS (G- Classroom & Zoom)	MCQ SEQ SAQ Viva Voce

LIST OF PRACTICALS

- Lip and tongue
- Salivary glands
- Thick and thin skin
- Eye
- Ear
- Pituitary gland
- Thyroid and parathyroid gland
- Adrenal gland

Physiology

S.No	Learning outcomes	Learning Objectives/ Content	MIT	Assessment Tool
1.	Describe the physiological mechanisms involved in special senses and the related abnormalities.	<ul style="list-style-type: none"> • Explain refraction and concept of convergence and divergence. • Define focal length, focal point and power of lens. • Differentiate between ametropic, myopia, hyperopia, astigmatism, presbyopia and describe their treatment • Discuss the concept of reduced eye and depth perception • Explain the process of its formation, circulation and regulation of aqueous humor. • Describe Intraocular pressure and pathophysiology of glaucoma. • Describe accommodation reflex, light reflex and their pathway • Describe physiological anatomy of retina and pathophysiology of retinal detachment. • Explain rhodopsin visual cycle and role of vitamin A in night blindness. • Describe photo transduction in photoreceptors • Explain the mechanism of regulation of retinal Sensitivity (light and dark adaptation). • Discuss and sketch the visual pathway and its lesions 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

		<ul style="list-style-type: none"> • Explain the visual cortex and its functional units. • Describe the mechanism of different types of eye movements <ul style="list-style-type: none"> • Discuss pathophysiology of strabismus Horner's syndrome and Argyll Robertson pupil • Discuss the effects of sympathetic and parasympathetic innervation of eye. 		
2.		<ul style="list-style-type: none"> • Describe the physiological Anatomy of ear • Explain the mechanism of conduction of sound waves through the ear to the cochlea <ul style="list-style-type: none"> □ Describe "Impedance Matching" and its importance • Describe the process of attenuation of sounds • Explain the Place Principle • Describe the functions of Organ of Corti • Explain the mechanism of determination of loudness • Identify the auditory pathway • Explain the process of determination of direction from which sound is coming • Describe various hearing Abnormalities 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
3.		<ul style="list-style-type: none"> • Describe various taste sensations • Describe the mechanism of stimulation of taste buds and the transmission of signals to CNS 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
4.		<ul style="list-style-type: none"> • Explain the physiological anatomy of olfactory membrane. 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

		<ul style="list-style-type: none"> Describe the mechanism of stimulation of olfactory cells and the transmission of signals to CNS Identify the primary sensations of smell Describe the transmission of signals of olfaction into the central nervous system 		
5.	Explain the basic physiology of endocrinology And describe the functions and related abnormalities of different hormones.	<ul style="list-style-type: none"> Describe the coordination of body functions by chemical messengers Identify the chemical structure and synthesis of hormones Identify the hormone secretion, transport, and clearance from the blood Explain the feedback control of hormone secretion Describe the transport of hormones in blood and “clearance” of hormones from the blood Identify the hormone receptors and Their activation Explain the intracellular signaling after hormone receptor activation Describe the second messenger mechanisms for mediating intracellular 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
6.		<ul style="list-style-type: none"> Describe the pituitary gland and its relation to the hypothalamus Describe the hypothalamichypophysial portal blood vessels of the anterior pituitary gland Explain the posterior pituitary gland and its relation to the hypothalamus Identify the physiological functions of ADH and oxytocin Hormone 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

7.		<ul style="list-style-type: none"> • Explain the physiological functions of growth hormone • Explain the regulation of growth hormone secretion • Describe the hypopituitarism and Hypopituitarism. 	Online LGIS/SGD/CBL	MCQ,SEQ, PBQ /Viva
8.		<ul style="list-style-type: none"> • Outline the synthesis and secretion of the thyroid metabolic hormones • Explain the physiologic functions of the thyroid hormones • Describe the regulation of thyroid hormone secretion <p>Describe the Diseases of the Thyroid gland</p>	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
9.	Describe the male and female reproductive functions and related abnormalities	<ul style="list-style-type: none"> • Describe the regulation of calcium and phosphate in the extracellular fluid and plasma • Identify the actions of vitamin D • Explain the effects of parathyroid hormone on calcium and phosphate concentrations in the extracellular fluid • Describe the control of parathyroid secretion by calcium ion concentration • Discuss the actions of calcitonin • Relate the pathophysiology of parathyroid hormone, vitamin D, and bone disease 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
10.		<ul style="list-style-type: none"> • Explain synthesis and secretion of adrenocortical hormones • Describe the functions of the mineralocorticoids aldosterone • Describe the functions of the glucocorticoids • Identify the abnormalities of adrenocortical secretion 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

11.		<ul style="list-style-type: none"> • Identify the metabolic effects of insulin • Describe the mechanisms of insulin secretion • Describe the control of insulin secretion • Outline the functions of glucagon • Describe the regulation of glucagon secretion • Describe the pathophysiology of diabetes mellitus 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
12.		<ul style="list-style-type: none"> • Identify the physiologic anatomy of the male sexual organs • Outline the process of spermatogenesis • Describe the functions of the seminal vesicles and prostate gland • Explain the abnormal spermatogenesis and male Fertility • Describe the functions of testosterone and other male sex hormones 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
13.		<ul style="list-style-type: none"> • Identify the physiologic anatomy of the female sexual organs • Relate the monthly ovarian cycle with function of the gonadotropic hormones • Describe the gonadotropic hormones and their effects on the ovarian cycle. • Outline the functions of the ovarian hormones—estradiol and progesterone • Describe the regulation of the female monthly rhythm—interplay between the ovarian and hypothalamic pituitary hormones and feedback 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

		oscillation of the hypothalamic pituitary axis <ul style="list-style-type: none"> • Identify the pituitaryovarian system • Explain physiological basis of puberty, menarche and menopause 		
14.		<ul style="list-style-type: none"> • Describe maturation and fertilization of the ovum • Explain the process of transport of the fertilized ovum in the fallopian tube • Describe the implantation of the 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
15.		Explain blastocyst in parturition and onset of labor and the hormones	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva
16.	Appreciate the physiological basis of fetal growth and neonatal adjustment to extra-uterine life	<ul style="list-style-type: none"> • Outline the growth and functional development of the fetus and development of the organ system • Identify the adjustments of the infant to extra uterine life • Explain the circulatory readjustments at birth • Describe the special problems of prematurity 	Online LGIS/SGD/CBL	MCQ, SEQ/ Viva

Physiology CBL

CBL 1: Vision

Zeeshan, a 6 years child, was brought to an ophthalmologist because his parents observed that his eyes are not properly aligned and he is using only left eye to look at various objects. His external ocular examination revealed healthy eye lids, palpebral fissures, conjunctiva and cornea. Pupils were equal in size and light and accommodation response was normal on both sides. Ocular motility was tested and unpairing of conjugate movements in the horizontal plane along with saccadic dysfunction was observed. Visual acuity was 6/6 in left eye and 6/24 in right eye. Intra ocular pressure was 12mm of Hg on both sides. Ophthalmoscopy and slit lamp examination revealed no abnormality. The ophthalmologist covered the normal eye with eye patch. He also counseled the parents about the conservative management plan and available surgical options and advised review after 01 month.

Learning objectives:

By the end of CBL session, the students will be able to

1. Discuss the optics of vision as a basis of refractive errors.
2. Describe the physiological basis of image formation on retina.
3. Describe the basis of ocular reflexes.
4. Explain the types of eye movements and their role in vision (locking unlocking movements, vestibular movements, saccadic movements, pursuit movements).
5. Describe the basis of interference excitation and fusion of visual images.

CBL 2: Acromegaly

A 44 years old man presented in OPD with complaints of gradual deterioration of vision, progressive increase in body weight and increased frequency of micturition. He also told the doctor that his shoe size had increased and he was facing problems in finding extra-large shoes for the last 2 years. His physical examination revealed the following:

Height = 1.73m (5 ft 8 inches),

Weight = 114 kg (250 lbs),

B.P = 140/80 mm Hg,

Thickened fingers and a large jaw and tongue.

Biochemical tests revealed:

IGF-1 = 1289 ng/ml (normal: 109 – 284 ng/ml)

Basal GH = 31 ng /ml (normal: 5 ng/ml)

TSH = 2.41 μ IU/ml (normal: 0.49 – 4.67 μ IU/ml)

Random blood glucose = 360 mg/dl (normal: 70 – 140 mg/dl)

Chest radiograph showed gross cardiomegaly. A pituitary MRI revealed a 4.5 cm macro adenoma which was compressing the optic chiasma significantly. **A diagnosis of acromegaly was made.**

Learning objectives:

1. Relate the symptoms and lab tests to the affected endocrine gland and the hormones.
2. Identify the manifestations of acromegaly which are normal or abnormal in this patient.
3. Enlist the hormones secreted by pituitary gland, their mechanism of action and regulation.
4. Elucidate the action of growth hormone and role of somatomedins in bone growth.
5. Comprehend feedback control of growth hormone secretion.
6. Differentiate between gigantism, acromegaly and dwarfism.

CBL 3: Diabetes Mellitus

A 10 year old Asif presented in pediatric OPD with complaints of significant weight loss in last six months despite having voracious appetite. He was constantly thirsty and was urinating every 30-40 min. He also had episodes of bed wetting.

On physical examination:

Height was 5 ft 1 inch

Weight was 95 lb which was 106 lb 2 months back.

BP 90/55 mm Hg in supine and 75/45 mm Hg in standing position.

Laboratory findings revealed the following:

Test	Patient's value	Normal Range
Fasting plasma glucose	320mg/dl	70-110 mg/dl

Plasma ketones	+1	Nil
Urinary glucose	+4	Nil
Urinary ketones	+2	Nil

On the basis of these findings diagnosis of type 1 diabetes was made. He was immediately started injectable insulin and counseled on how to monitor blood glucose with finger stick. He was advised regular check-up for monitoring of renal function.

Learning objectives:

At the end of the session, the students should be able to:

1. Comment on the pathophysiology and significance of
 - a. Urinary and plasma ketones
 - b. Urinary glucose
 - c. Weight loss in diabetes
2. Explain the effects of insulin on carbohydrate, protein and fat metabolism.
3. Explicate the mechanism of action of insulin.
4. Elucidate the role of insulin in controlling blood sugar level in postprandial and fasting state.
5. Describe the causes, age of onset, diagnostic criteria, complications and treatment options of different types of diabetes mellitus.

CBL 4 : Cushing's Syndrome

A 35-year-old woman comes to her physician's office with the complaint of recent rapid weight gain and excessive sweating. What initiated her visit was a recent panic attack that frightened her. Her face looks swollen compared with the rest of her body. She complains of recent weakness, backaches, and headaches, and her periods have lately been irregular. Over the past month, she has noticed frequent bruising with slow healing. She is not on any birth control or using any medication except for acetaminophen for the headaches.

PHYSICAL EXAMINATION

Vital Signs: Temp: 37°C, Pulse 68/min, Resp rate 14/min, BP 130/86 mm Hg, BMI 33 Physical Examination: The patient's face is round and her trunk is swollen, but her arms and legs are thin. She sounds depressed. She has supraclavicular fat pads.

LABORATORY STUDIES & IMAGING

- Pregnancy test (HCG): Negative
- Glucose tolerance: Abnormal, consistent with insulin resistance.
- Plasma cortisol levels: 4 pm: 25 µg/dL (normal: 3-15µg/dL). Dexamethasone is given orally at 11 pm. At around 8 am the next morning, cortisol levels are 35 µg/dL (normal: < 5 µg/dL).
- 24-Hour urine collection for free cortisol: Abnormally high
- Plasma ACTH: 7 pg/mL (normal: > 20 pg/mL)
- MRI of the pituitary was normal. CT of abdomen and chest: Adrenal tumor □ Diagnosis of Cushing's syndrome (primary hypercortisolism from adrenal tumor) was made.

Learning objectives:

By the end of CBL session, the students will be able to:

1. Explain the relevance of protein carriers in blood for hydrophobic hormones and the mechanism that determine the level of free circulating hormone.
2. Describe the functions of cortisol and correlate the clinical manifestations of the given patient with cortisol excess.
3. Compare the roles of cortisol, insulin, growth hormone and glucagon in glucose homeostasis.
4. Describe the principles of feedback control for cortisol release and its relevance for homeostasis.
5. Describe the disease state that results from under secretion of corticosteroids.
6. Differentiate between Cushing' disease and Cushing's syndrome.

Biochemistry

LEARNING OBJECTIVES:

1. Understand the biochemistry of Hormones and their effects on different metabolic processes
2. Biochemistry of Reproductive hormones
3. Comprehend primary and secondary metabolism of Lipids
4. Understand Integration and regulation of Metabolic Pathways in Different Tissues

S No.	Learning outcomes: By the end of session, the student should be able to:	MIT LGIS/ SGD/ CBL/ Practical/ Tutorial	Mode of assessment Theory/ OSCE/ Viva Voce
1.	Describe the endocrine system of human body and different types of glands.	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
2.	Illustrate the classification of hormones on basis of their chemical nature and mechanism of action	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
3.	Describe the detailed Mechanism of action of various hormones	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
4.	Elaborate chemistry and composition, functions, daily secretion, stimulants and depressants of growth hormone. Describe regulation and effect on Carbohydrates, Lipids,	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE

	Proteins, Mineral and water metabolism and disorders of Growth Hormone		
5.	Elaborate chemistry and composition, functions, daily secretion, stimulants and depressants of Thyroid hormone. Describe regulation and effect on Carbohydrates, Lipids, Proteins, Mineral and water metabolism and disorders of Thyroid hormone	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
6.	Elaborate chemistry and composition, functions, daily secretion, stimulants and depressants of Adrenal hormones. Describe regulation and effect on Carbohydrates, Lipids, Proteins, Mineral and water metabolism and disorders of Adrenal hormones	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
7.	Elaborate chemistry and composition, functions, daily secretion, stimulants and depressants of Pancreatic hormone. Describe regulation and effect on Carbohydrates, Lipids, Proteins, Mineral and water metabolism and disorders of Pancreatic hormones	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
8.	Elaborate chemistry and composition, functions, daily secretion, stimulants	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE

	and depressants of Parathyroid hormone. Describe regulation and effect on Carbohydrates, Lipids, Proteins, Mineral and water metabolism and disorders of parathyroid hormone		
9.	Illustrate the chemistry, synthesis and functions of Androgens	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
10.	Illustrate the chemistry, synthesis and functions of Estrogen	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
11.	Describe Mobilization and transport of fatty acids, tricylglycerol, and sterols	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
12.	Comprehend Oxidation of fatty acids - Activation and transport of fatty acid in the mitochondria - Boxidation, fate of Acetyl CoA, regulation of B-oxidation - Other types of oxidation, i.e. alpha- oxidation, w-oxidation, peroxisome oxidation, oxidaton of odd number carbon containing fatty acids and Unsaturated fatty acids etc.	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
13.	Explain Biosynthesis of fatty acids	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
14.	Illustrate Eicosanoids, synthesis from Arahidonic acid, their mechanism and biochemical	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE

	functions		
15.	Explain Triacylglycerol synthesis and regulation	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
16.	Describe Synthesis and degradation of phospholipids and their metabolic disorders	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
17.	Comprehend Cholesterol synthesis, regulation, functions, fate of intermediates of Cholesterol synthesis, Hypercholesterolemia, Atherosclerosis	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
18.	Describe Ketogenesis - Mechanism and utilization of Ketone bodies and significance - Ketosis and its mechanism	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
19.	Illustrate Plasma Lipoproteins, VLDL, LDL, HDL, and Chylomicrons, their transport, functions and importance in health and disease	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
20.	Explain Glycolipid metabolism and abnormalities	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
21.	Comprehend Chemistry and Metabolic effects of insulin and glucagon on metabolism	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
22.	Describe Feed fast cycle and Biochemistry of Liver, brain , skeletal muscle and kidney in fasting state	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE

23.	Explain Biochemistry of Liver, brain , skeletal muscle and kidney in fed state	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
24.	Illustrate Biochemistry Adipose tissue in fed and fasting state	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
25.	Explain Biochemical and metabolic Aspects of Diabetes mellitus	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
26.	Comprehend Biochemistry and Metabolic consequences of Obesity	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE
27.	Integration and regulation of Metabolic Pathways in Different Tissues	Online LGIS/ SGD/ CBL/ Tutorial	SAQs/SEQs/ Viva/OSPE



Learning Resources

Anatomy

- a) Clinical Anatomy for Medical Students by Richard Snell (9th edition).
- b) Basic Histology Text and Atlas by Luiz Carlos and Junqueira (14th edition)
- c) Basic Histology by Laiq Hussain Siddiqui (5th Revised edition)
- d) Medical Embryology by Langman (14th edition).
- e) Essential Clinical Anatomy by Keith Moore (7th edition).
- f) The Developing Human by Keith Moore (10th edition).
- g) General Anatomy by Laiq Hussain Siddiqui.

PHYSIOLOGY

- a) Guyton and Hall Textbook of Medical Physiology, 13th Edition by John E. Hall.
- b) Human Physiology: From Cells to Systems, 9th Edition by Lauralee Sherwood.
- c) Ganong's Review of Medical Physiology, 25th Edition (LANGE Basic Science) by Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen Brooks.
- d) Practical physiology by CL Ghai
- e) Electronic modes

BIOCHEMISTRY

- a) Lippincott's illustrated reviews, 7th edition
- b) Harper's illustrated Biochemistry, 30th edition
- c) M.N Chatterjea Textbook of Biochemistry , 8th edition
- d) M.D Vasudevan, Sreekumari, M.D.S;Kannan, M.D. Vaidyanathan D.M Textbook of Biochemistry for medical students, 2016
- e) Practical Biochemistry Manual (Prof Maj Gen AK Naveed, Dr Shakir Khan)
- f) Electronic modes

Feedback on the study guide

We value your feedback and will use it for improvement of this Study guide.

Kindly provide feedback for this study guide. At the email:

dme@ckmc.edu.pk

References:

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