COMPETENCY BASED UNDERGRADUATE CURRICULUM FOR THE INDIAN MEDICAL GRADUATE

2024

National Medical Commission
Pocket-14, Sector- 8, Dwarka
New Delhi 110 077

ANATOMY

ANATOMY (CODE: AN)

Contents
Volume I

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
Anatomy (Topics = 82, Competencies = 413)							
Topic 1: Anatomical terminology -		**Number of Competencies (2)**			**Number of competencies for certification: (NIL)**		
AN1.1	Describe & Demonstrate normal anatomical position, various planes, relation, comparison, laterality & movements in the human body	K/S	SH	Y	LGT, Demonstration	Written/ Viva voce/ skills assessment	
AN1.2	Describe composition of bone and bone marrow	K	KH	Y	LGT	Written/ viva	
Topic 2: General features of bones & Joints		**Number of Competencies (6)**			**Number of competencies for certification: (NIL)**		
AN2.1	Describe parts, types, peculiarities of each type, blood and nerve supply of bones.	K	KH	Y	LGT	Written/ viva voce	
AN2.2	Describe the laws of ossification, epiphysis, its various types and their importance	K	KH	N	LGT	Written/ Viva voce	
AN2.3	Describe special features of a sesamoid bone	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN2.4	Describe various types of cartilage with its structure & distribution in body	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN2.5	Describe & demonstrate various joints with possible movements, subtypes and examples	K,S	SH	Y	LGT, Demonstration	Written/ Viva voce/skills assessment	
AN2.6	Explain the concept of nerve supply of joints & Hilton's law	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
Topic 3: General features of Muscle		**Number of Competencies (3)**			**Number of competencies for certification: (NIL)**		
AN3.1	Classify & describe muscle tissue according to structure, size, shape, region & action	K	KH	Y	LGT, Demonstration	Written/ Viva voce	

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AN3.2	Describe parts of skeletal muscle and differentiate between tendons and aponeuroses with examples	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN3.3	Explain Shunt and spurt muscles with examples and role in joint movement	K	KH	N	LGT, Demonstration	Written/ Viva voce	
	Topic 4: General features of skin and fascia	**Number of Competencies (5)**			**Number of competencies for certification: (NIL)**		
AN4.1	Describe different types of skin & dermatomes in body	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN4.2	Describe & demonstrate structure of skin with its appendages along with clinical anatomy	K,S	SH	Y	LGT, Demonstration	Written/ Viva voce	
AN4.3	Describe structure, contents and identify modifications of superficial fascia along with fat distribution in body	K,S	SH	Y	LGT, Demonstration	Written/ Viva voce	
AN4.4	Describe & demonstrate modifications of deep fascia with its location, function & examples	K,S	SH	Y	LGT, Demonstration	Written/ Viva voce	
AN4.5	Explain principles of skin incisions and their surgical importance	K	KH	N	LGT, Demonstration	Written	
	Topic 5: General features of the cardiovascular system	**Number of Competencies (8)**			**Number of competencies for certification: (NIL)**		
AN5.1	Differentiate between blood vascular and lymphatic system	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN5.2	Differentiate between pulmonary and systemic circulation	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN5.3	Describe general differences between arteries, veins and sinuses	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN5.4	Explain functional and gross structural differences between elastic, muscular arteries and arterioles	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN5.5	Describe portal system giving examples	K	KH	Y	LGT, Demonstration	Written/ Viva voce	

AN5.6	Describe the concept of anastomoses and collateral circulation, its different sites & significance of end arteries	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
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AN5.7	Explain function of meta-arterioles, precapillary sphincters, arterio-venous anastomoses	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN5.8	Describe thrombosis, infarction & aneurysm	K	KH	N	LGT, Demonstration	Written/ Viva voce	
Topic 6: General Features of lymphatic system		**Number of Competencies (3)**			**Number of competencies for certification: (NIL)**		
AN6.1	Describe the components and functions of the lymphatic system	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN6.2	Describe structure of lymph capillaries & mechanism of lymph circulation	K	KH	N	LGT, Demonstration	Written	
AN6.3	Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system	K	KH	N	LGT, Demonstration	Written/ Viva voce	
Topic 7: Introduction to the nervous system		**Number of Competencies (8)**			**Number of competencies for certification: (NIL)**		
AN7.1	Describe general plan of nervous system with components of central, peripheral & autonomic nervous systems	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN7.2	List components of nervous tissue and their functions	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN7.3	Describe parts of a neuron and classify them based on number of neurites, size & function	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN7.4	Describe structure of a typical spinal nerve	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN7.5	Describe principles of sensory and motor innervation of muscles	K	KH	N	LGT, Demonstration	Written	
AN7.6	Describe concept of loss of innervation of a muscle with its applied anatomy	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN7.7	Describe various types of synapse	K	KH	N	LGT, Demonstration	Written	
AN7.8	Describe differences between sympathetic and	K	KH	N	LGT,	Written	

	spinal ganglia				Demonstration		
Topic 8: Features of individual bones (Upper Limb)		**Number of Competencies (4)**			**Number of competencies for certification: (NIL)**		
AN8.1	Identify the given bone, its side, anatomical position, joint formation, important features and clinical anatomy (clavicle, scapula, humerus, radius, ulna, carpal bones)	K,S	SH	Y	Demonstration	Written/ Viva voce/ skill assessment	

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AN8.2	Demonstrate important muscle attachments on the given bone	K,S	SH	Y	Demonstration	Written / Viva voce / skill assessment	
AN8.3	Identify and name various bones in articulated hand, Specify the parts of metacarpals and phalanges and enumerate the peculiarities of pisiform	K,S	SH	Y	Demonstration	Viva voce / Practical's	
AN8.4	Describe scaphoid fracture and explain the anatomical basis of avascular necrosis	K	KH	N	LGT, Demonstration	Viva voce	
Topic 9: Pectoral region		**Number of Competencies (3)**			**Number of competencies for certification: (NIL)**		
AN9.1	Describe attachment, nerve supply & action of pectoralis major and pectoralis minor and describe clavipectoral fascia	K	KH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce	
AN9.2	Describe the location, extent, deep relations, structure, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast	K	KH	Y	LGT,	Written/ Viva voce	
AN9.3	Describe development of breast, associated age changes and congenital anomalies	K	KH	N	LGT, Demonstration	Written/ Viva voce	
Topic 10: Axilla, Shoulder and Scapular region		**Number of Competencies (13)**			**Number of competencies for certification: (NIL)**		

AN10.1	Identify & describe boundaries and contents of axilla	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN10.2	Identify, describe and demonstrate the origin, extent, course, parts, relations and branches of axillary artery & tributaries of axillary vein	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN10.3	Describe, identify and demonstrate formation, branches, relations, area of supply of branches, course and relations of terminal branches of brachial plexus	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce / skill assessment	

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AN10.4	Describe the anatomical groups of axillary lymph nodes and specify their areas of drainage	K	KH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce / skill assessment	
AN10.5	Explain variations in formation of brachial plexus	K	KH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce	
AN10.6	Explain the anatomical basis of clinical features of Erb's palsy and Klumpke's paralysis	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN10.7	Describe axillary lymph nodes, areas of drainage and anatomical basis of their enlargement	K	KH	Y	LGT, Practical, Demonstration, Dissection	Written	
AN10.8	Describe, identify and demonstrate the position, attachment, nerve supply and actions of trapezius and latissimus dorsi	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce / skill assessment	
AN10.9	Describe the arterial anastomosis around the scapula and mention the boundaries of triangle of auscultation	K	KH	N	LGT, Practical, Demonstration, Dissection	Written	
AN10.10	Describe and identify the deltoid and rotator cuff muscles along with their nerve supply and clinical anatomy	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	

AN10.11	Describe & demonstrate attachment, action and clinical anatomy of serratus anterior muscle	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN10.12	Describe and demonstrate shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	

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AN10.13	Explain anatomical basis of Injury to axillary nerve during intramuscular injections	K	KH	Y	LGT	Viva voce	
	Topic 11: Arm & Cubital fossa certification: (NIL)				**Number of Competencies (6)**	**Number of competencies for**	
AN11.1	Describe and demonstrate muscle groups of upper arm with emphasis on biceps and triceps brachii	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN11.2	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels in arm	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN11.3	Describe the anatomical basis of Venipuncture of cubital veins	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN11.4	Describe the anatomical basis of Saturday night paralysis	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN11.5	Identify & describe boundaries and contents of cubital fossa	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN11.6	Describe the anastomosis around the elbow joint	K	KH	N	LGT	Written	
	Topic 12: Forearm & hand certification: (NIL)				**Number of Competencies (15)**	**Number of competencies for**	

AN12.1	Describe and demonstrate important muscle groups of ventral forearm with attachments, nerve supply and actions	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.2	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of forearm	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
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AN12.3	Identify & describe flexor retinaculum with its attachments	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.4	Explain anatomical basis of carpal tunnel syndrome	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN12.5	Identify & describe small muscles of hand. Also describe movements of thumb and muscles involved	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.6	Describe & demonstrate movements of thumb and muscles involved	K,S	SH	Y	Practical, Demonstration	Written/ Viva voce/ skill assessment	
AN12.7	Identify & describe course and branches of important blood vessels and nerves in hand	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.8	Describe anatomical basis of Claw hand	K	KH	Y	LGT, Demonstration, Practical	Written/ Viva voce	
AN12.9	Identify & describe fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce	
AN12.10	Explain infection of fascial spaces of palm	K	KH	N	LGT	Written	

AN12.11	Identify, describe and demonstrate important muscle groups of dorsal forearm with attachments, nerve supply and actions	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.12	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of forearm	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
Number	**COMPETENCY The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
AN12.13	Describe the anatomical basis of Wrist drop	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN12.14	Identify & describe compartments deep to extensor retinaculum and describe the boundaries and contents of anatomical snuff box.	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
AN12.15	Identify & describe extensor expansion formation	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	
	Topic 13: General Features, Joints, radiographs & surface marking					**Number of competencies: (8)** **Number of competencies for certification: (NIL)**	
AN13.1	Describe and explain Fascia of upper limb and compartments, veins of upper limb and its lymphatic drainage	K	KH	Y	LGT, demonstration	Written/ Viva voce	
AN13.2	Describe dermatomes of upper limb	K	KH	N	LGT	Written/ Viva voce	
AN13.3	Identify & describe the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, blood and nerve supply of elbow joint, proximal and distal radio-ulnar joints, wrist joint & first carpometacarpal joint	K,S	SH	Y	LGT, Practical, Demonstration, Dissection	Written/ Viva voce/ skill assessment	

AN13.4	Describe Sternoclavicular joint, Acromioclavicular joint, Carpometacarpal joints & Metacarpophalangeal joint	K	KH	N	LGT, Practical, Demonstration	Written/ Viva voce/ skill assessment	
AN13.5	Identify the bones and joints of upper limb seen in anteroposterior and lateral view radiographs of shoulder region, arm, elbow, forearm and hand	K,S	SH	Y	LGT, Practical, Demonstration	Viva voce/ skill assessment	
AN13.6	Identify & demonstrate important bony landmarks of upper limb: Jugular notch, sternal angle, acromial angle, spine of the scapula, vertebral level of the medial end and Inferior angle of the scapula	K,S	SH	Y	Practical, Demonstration	Viva voce/ skill assessment	
Number	**COMPETENCY The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
AN13.7	Identify & demonstrate surface projection of: Cephalic and basilic vein, Palpation of Brachial artery, Radial artery, Testing of muscles: Trapezius, pectoralis major, serratus anterior, latissimus dorsi, deltoid, biceps brachii, Brachioradialis	K,S	SH	Y	Practical, Demonstration	Viva voce/ skill assessment	
AN13.8	Describe development of upper limb	K	KH	N	LGT	Written	
Topic 14: Features of individual bones (Lower Limb)		**Number of Competencies (4)**			**Number of competencies for certification: (NIL)**		
AN14.1	Identify the given bone, its side, anatomical position, joint formation, important features and clinical anatomy (hip bone, femur, tibia fibula, tarsal bones)	K,S	SH	Y	Demonstration	Viva voce	
AN14.2	Identify & describe joints formed by the given bone	K,S	SH	Y	LGT, Demonstration	Viva voce	
AN14.3	Describe the importance of ossification of lower end of femur & upper end of tibia, and explain violation of law of	K	KH	Y	LGT, Demonstration	Viva voce	

	ossification in fibula						
AN14.4	Identify and name various bones in the articulated foot with individual muscle attachment	K,S	SH	N	LGT, Demonstration	Viva voce	
	Topic 15: Front & Medial side of thigh	**Number of Competencies (5)**			**Number of competencies for certification: (NIL)**		
AN15.1	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior thigh	K,S	SH	Y	LGT, Dissection, Practical, Demonstration	Written/ Viva voce/ skill assessment	
AN15.2	Describe and demonstrate major muscles with their attachment, nerve supply and actions	K,S	SH	Y	LGT, Dissection, Practical, Demonstration	Written/ Viva voce/ skill assessment	
AN15.3	Describe and demonstrate boundaries, floor, roof and contents of femoral triangle	K,S	SH	Y	LGT, Dissection, Practical, Demonstration	Written/ Viva voce/ skill assessment	
AN15.4	Explain anatomical basis of Psoas abscess & Femoral hernia	K	KH	N	LGT, Demonstration	Written/ Viva voce	

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AN15.5	Describe and demonstrate adductor canal with its contents	K,S	SH	Y	LGT, Demonstration	Written/ Viva voce/ skill assessment	
	Topic 16: Gluteal region & back of thigh	**Number of Competencies (6)**			**Number of competencies for certification: (NIL)**		
AN16.1	Describe and demonstrate major muscles with their attachment, nerve supply and actions.	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN16.2	Describe and demonstrate structures under the cover of gluteus maximus. Also explain the anatomical basis of	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	

	sciatic nerve injury during gluteal intramuscular injections						
AN16.3	Explain the anatomical basis of Trendelenburg sign	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN16.4	Describe and demonstrate the hamstrings group of muscles with their attachment, nerve supply and actions	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN16.5	Describe and demonstrate the origin, course, relations, branches (or tributaries), termination of important nerves and vessels on the back of thigh	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN16.6	Describe and demonstrate the boundaries, roof, floor, contents and relations of popliteal fossa with its clinical anatomy	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
	Topic 17: Hip Joint	**Number of Competencies (3)**			**Number of competencies for certification: (NIL)**		
AN17.1	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the hip joint	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
	COMPETENCY The student should be able to	**Predominant Domain K/S/A/C**	**Level K/KH/SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
AN17.2	Describe anatomical basis of complications of fracture neck of femur	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN17.3	Describe dislocation of hip joint and surgical hip replacement	K	KH	N	LGT, Demonstration	Written/ Viva voce	

	Topic 18: Knee joint, Anterior compartment of leg & dorsum of foot	**Number of Competencies (7)**			**Number of competencies for certification: (NIL)**		
AN18.1	Describe and demonstrate major muscles of anterior compartment of leg with their attachment, nerve supply and actions	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN18.2	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior compartment of leg	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN18.3	Explain the anatomical basis of foot drop	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN18.4	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, nerve supply, bursae around the knee joint along with anastomosis around the knee joint	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN18.5	Explain the anatomical basis of locking and unlocking of the knee joint	K	KH	Y	LGT, Demonstration, Practical	Written/ Viva voce	
AN18.6	Describe knee joint injuries with its applied anatomy	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN18.7	Explain anatomical basis of Osteoarthritis	K	KH	N	LGT	Written/ Viva voce	
	Topic 19: Back of Leg & Sole	**Number of Competencies (7)**			**Number of competencies for certification: (NIL)**		
AN19.1	Describe and demonstrate the major muscles of back of leg with their attachment, nerve supply and actions	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	

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AN19.2	Describe and demonstrate the origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of leg	K,S	SH	Y	Dissection, LGT, SGT, Demonstration	Written/ Viva voce/ skill assessment	
AN19.3	Explain the concept of "Peripheral heart"	K	KH	Y	LGT	Written/ Viva voce	
AN19.4	Explain the anatomical basis of rupture of calcaneal tendon	K	KH	N	LGT	Written/ Viva voce	
AN19.5	Describe factors maintaining importance arches of the foot with its importance	K	KH	Y	LGT	Written/ Viva voce	
AN19.6	Explain the anatomical basis of Flat foot & Club foot	K	KH	N	LGT	Written/ Viva voce	
AN19.7	Explain the anatomical basis of Metatarsalgia & Plantar fasciitis	K	KH	N	LGT	Written/ Viva voce	
	Topic 20: General Features, Joints, radiographs & surface marking certification: (NIL)		Number of Competencies (10)			Number of competencies for	
AN20.1	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply of tibiofibular and ankle joint	K,S	SH	Y	Dissection, LGT, SGT, Demonstration, Practical	Written/ Viva voce/ skill assessment	
AN20.2	Describe the subtalar and transverse tarsal joints	K	KH	N	LGT, Demonstration	Written/ Viva voce	
AN20.3	Describe and demonstrate Fascia lata, Venous drainage, Lymphatic drainage, Retinacula & Dermatomes of lower limb	K,S	SH	Y	LGT, Demonstration, Dissection, Practical	Written/ Viva voce/ skill assessment	

AN20.4	Explain anatomical basis of enlarged inguinal lymph nodes	K	KH	N	LGT	Written/ Viva voce	
AN20.5	Explain anatomical basis of varicose veins and deep vein thrombosis	K	KH	Y	LGT, Demonstration	Written/ Viva voce	
AN20.6	Identify the bones and joints of lower limb seen in anteroposterior and lateral view radiographs of various regions of lower limb	K/S	SH	Y	LGT, SGT, Demonstration	Viva voce/ skill assessment	

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2024

National Medical Commission
Pocket-14, Sector- 8, Dwarka
New Delhi 110 077

PHYSIOLOGY (CODE: PY)

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PHYSIOLOGY (Topics = 12, Competencies = 136)							
	Topic 1: General Physiology				**Number of competencies: (7) Number of competencies that require certification: (NIL)**		
PY1.1	Describe the structure and functions of a cell, intercellular communication and their applications in Clinical care and research	K	KH	Y	LGT	Written/Viva voce	
PY1.2	Discuss the principles of homeostasis and feedback mechanism	K	KH	Y	LGT	Written/Viva voce	
PY1.3	Describe apoptosis (programmed cell death) , explain its mechanism of action and physiological significance.	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.4	Describe and discuss various transport mechanisms across cell membranes	K	KH	Y	LGT Student Seminar	Written/Viva voce/Assignments	
PY1.5	Describe the fluid compartments of the body, its ionic composition & measurement methods	K	KH	Y	LGT	Written/Viva voce	
PY1.6	Describe the concept of pH & Buffer systems in the body	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.7	Describe the molecular basis of resting membrane potential (RMP) and generation of action potential in a nerve fibre	K	KH	Y	LGT SGT/Tutorial	Written/Viva voce	
	Topic 2: Haematology				**Number of competencies: (13) Number of competencies that require certification: (01)**		
PY2.1	Describe the composition and functions of blood and its components	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.2	Discuss the origin, forms, variations and functions of plasma proteins and its clinical implications	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.3	Describe the physiological structure, synthesis, functions and breakdown of Hemoglobin. Discuss its variants and clinical significance.	K	KH	Y	LGT SGT	Written/Viva voce	

PY2.4	Describe Erythropoiesis & discuss its regulation in physiological and pathological situations	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.5	Describe anaemias, polycythemia & jaundice and discuss its physiological principles of management	K	KH	Y	LGT SGT, Student Seminar, ECE	Written/Viva voce	
PY2.6	Describe the formation of WBC (Leucopoiesis), structure and function of various WBC types and their regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY2.7	Discuss 'Immunity' in terms of its types, development, regulation and physiological significance	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY2.8	Describe the formation of platelets (thrombopoiesis), structure, functions and variations.	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.9	Describe hemostasis, coagulation pathways, mechanism of action of anticoagulants and briefly discuss pathophysiological aspects of bleeding & clotting disorders (e.g. hemophilia, purpura)	K	KH	Y	LGT SGT, ECE-Visit to blood bank Flipped Classroom	Written/Viva voce	
PY2.10	Discuss types of blood groups, clinical importance of blood grouping, blood banking and transfusion	K	KH	Y	LGT SGT, ECE-Visit to blood bank	Written/Viva voce	
PY2.11	Estimate Hb, RBC, TLC, DLC, Blood groups, BT/CT, RBC indices	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY2.12	Describe the test to measure Erythrocyte Sedimentation Rate (ESR), Osmotic fragility, Hematocrit, and interpret its findings	K	KH	Y	Demonstration	Written /Viva voce/OSPE (Question station)	
PY2.13	Describe steps for reticulocyte and platelet count	K	KH	Y	Demonstration	Written /Viva voce	
	Topic 3: Nerve and Muscle Physiology require certification : (01)		**Number of competencies: (12)**			**Number of competencies that**	
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss nerve growth factors	K	KH	Y	LGT	Written/Viva voce	
PY3.2	Describe the types, functions, properties of nerve fibers including strength duration curve, chronaxie and rheobase	K	KH	Y	LGT	Written/Viva voce	
PY3.3	Classify nerve injury and discuss the mechanism of degeneration and regeneration in peripheral nerves	K	KH	Y	LGT	Written/Viva voce	
PY3.4	Describe the microscopic structure of neuro-muscular junction (NMJ) and mechanism of neuromuscular transmission	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.5	Discuss the applied aspects of neuromuscular junction : myasthenia gravis, Lambert Eaton syndrome and neuromuscular blocking agents.	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY3.6	Describe the different types of muscle fibres, their structure and physiological basis of action potential	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY3.7	Describe properties, action potential and molecular basis of muscle contraction in skeletal muscle	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY3.8	Describe properties, action potential and molecular basis of muscle contraction in smooth muscle	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.9	Describe the mode of muscle contraction (isometric and isotonic), energy source, muscle metabolism and gradation of muscular activity	K	KH	Y	LGT	Written/Viva voce	
PY3.10	Enumerate and briefly discuss myopathies	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.11	Perform Ergography and calculate the work done by a skeletal muscle	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY3.12	Observe with Computer assisted learning (i) Amphibian nerve -muscle experiments (ii) Amphibian cardiac experiments	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	
	Topic 4: Gastro-intestinal Physiology require certification : (01)		**Number of competencies: (12)**			**Number of competencies that**	
PY4.1	Describe the functional anatomy of digestive system	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.2	Enumerate various Gastrointestinal hormones (GI) hormones, discuss their functions and regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.3	Describe the composition, mechanism of secretion, functions, and regulation of saliva	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.4	Describe the composition, mechanism of secretion, functions, and regulation of gastric juice. Discuss various gastric function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.5	Describe the composition, mechanism of secretion, functions, and regulation of pancreatic juice including various pancreatic exocrine function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.6	Describe the composition, mechanism of secretion, functions, and regulation of intestinal juices	K	KH	Y	LGT	Written/Viva voce	

PY4.7	Describe the physiology of digestion and absorption of nutrients	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.8	Describe GIT movements, its regulation and physiological significance including defecation reflex and the role of dietary fibres	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH / SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY4.9	Describe the structure , functions and secretion of liver and gallbladder with elaboration of various liver function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.10	Describe the Gut-Brain Axis and its physiological significance	K	KH	Y	LGT SGT,	Written/Viva voce	
PY4.11	Discuss (in brief) the applied physiology of GIT viz. Peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	K	KH	Y	LGT SGT, ECE, SDL	Written/Viva voce	
PY4.12	Obtain relevant history and conduct correct General and Clinical examination of the abdomen in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAP (Simulation or real life setting)	Skill assessment/ Viva voce/OSCE	1
	Topic 5: Cardiovascular Physiology		**Number of competencies: (16)**			**Number of competencies that require certification : (03)**	
PY5.1	Describe the functional anatomy of heart including chambers and coronary circulation	K	KH	Y	LGT	Written/Viva voce	
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.3	Describe generation and conduction of cardiac impulse along with the conduction pathway (including pacemaker potential).	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.4	Discuss the physiological events occurring during the cardiac cycle, concurrent pressure volume changes, generation of heart sounds and murmur	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY5.5	Describe the physiology of electrocardiogram (E.C.G), the cardiac axis and its applications	K	KH	Y	LGT SGT, ECE	Written/Viva voce/OSCE (Question station)	

PY5.6	Discuss physiological variations in ECG waveforms, abnormal waveforms and intervals , arrhythmias, heart blocks and myocardial Infarction	K	KH	Y	LGT SGT/Student seminars/ECE	Written/Viva voce	
PY5.7	Discuss haemodynamics of circulatory system	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY5.8	Describe and discuss local and systemic cardiovascular regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.9	Describe heart rate, factors affecting heart rate, and its regulation	K	KH	Y	LGT SGT	Written/Viva voce	

Number	**COMPETENCY The student should be able to:**	**Predominant Domain K/S/A/C**	**Level K/KH / SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
PY5.10	Describe cardiac output, factors affecting cardiac output and its regulation.	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.11	Describe blood pressure, factors affecting blood pressure and its regulation	K	KH	Y	LGT SGT/Student seminars	Written/Viva voce	
PY5.12	Describe & discuss regional circulation including microcirculation, lymphatic circulation, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.13	Describe the patho-physiology of shock, syncope heart failure with physiological basis of its management	K	KH	Y	LGT SGT / Student seminars	Written/Viva voce	
PY5.14	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	3
PY5.15	Record and interpret normal ECG in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	1
PY5.16	Obtain relevant history and conduct General and Clinical examination of the cardiovascular system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
	Topic 6: Respiratory Physiology		**Number of competencies: (13)**			**Number of competencies that require certification : (02)**	
PY6.1	Describe the functional anatomy of respiratory tract and non-respiratory functions of lungs	K	KH	Y	LGT SGT	Written/Viva voce	

PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities (Static and Dynamic)	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.3	Describe the alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.4	Discuss the transport of respiratory gases viz Oxygen and Carbon dioxide across lungs and whole body	K	KH	Y	LGT	Written/Viva voce	
PY6.5	Describe the chemoreceptors (peripheral and central) and neural centres of respiration including chemical and neural regulation of respiration	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH / SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis, asphyxia, drowning, periodic breathing and oxygen therapy	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.7	Discuss various lung function tests and their clinical significance in obstructive and restrictive lung diseases	K	KH	Y	LGT SGT, Tutorials Flipped Classroom	Written/Viva voce	
PY6.8	Discuss the physiology of high altitude and acclimatization	K	KH	Y	LGT	Written/Viva voce	
PY6.9	Discuss the physiology of deep sea diving and decompression sickness	K	KH	Y	LGT	Written/Viva voce	
PY6.10	Perform Spirometry and interpret the findings (Digital / Manual)	S	P	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
PY6.11	Describe principles and methods of artificial respiration	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	
PY6.12	Obtain relevant history and conduct correct General and Clinical examination of the respiratory system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Practical/OSPE/ Viva voce	1
PY6.13	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	

	Topic 7: Renal Physiology require certification : (NIL)		Number of competencies: (9)			Number of competencies that	
PY7.1	Describe the functional anatomy of kidney and non-excretory functions of kidney	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.2	Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system	K	KH	Y	LGT	Written/Viva voce	
PY7.3	Describe the mechanism of urine formation involving processes of filtration (Glomerular filtration), tubular reabsorption & secretion.	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY7.4	Describe the mechanism of urine concentration and dilution (Counter current Multiplier & Exchanger)	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY7.5	Describe the renal regulation of fluid and electrolytes & acid-base balance	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH / SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY7.7	Describe cystometry and discuss the normal cystometrogram	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.8	Discuss various Renal Function Tests with its physiological significance and clinical implication of Renal clearance	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY7.9	Discuss the role of artificial kidneys, dialysis and indications of renal transplant	K	KH	Y	LGT	Viva voce	
	Topic 8: Endocrine Physiology require certification : (NIL)	**Number of competencies: (7)**			**Number of competencies that**		
PY8.1	Describe the functional anatomy of endocrine glands, mechanism of hormonal action (steroid and peptide) and hypothalamus pituitary axis {HPA}	K	KH	Y	LGT Flipped Classroom	Written/Viva voce	
PY8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland	K	KH	Y	LGT SGT	Written/Viva voce	

PY8.3	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of thyroid gland including thyroid function tests	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY8.4	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of adrenal gland and its function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.5	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of parathyroid gland with emphasis of physiology of bone and calcium metabolism	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY8.6	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pancreatic gland including pancreatic function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.7	Describe the physiology of Thymus & Pineal Gland	K	KH	Y	LGT	Written/Viva voce	

	Topic 9: Reproductive Physiology **Number of competencies: (10)** **Number of competencies that require certification : (NIL)**						
Number	**COMPETENCY The student should be able to:**	**Predominant Domain K/S/A/C**	**Level K/KH / SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
PY9.1	Explain sex determination, sex differentiation and their abnormalities and discuss the effects of removal of gonads on physiological functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.2	Describe and discuss puberty: onset, progression, stages; early and delayed puberty.	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.3	Describe the functional anatomy of male reproductive system, functions of testis, spermatogenesis and discuss the functions and regulations of testosterone hormone	K	KH	Y	LGT SGT	OSPE/Viva voce	
PY9.4	Describe the functional anatomy of female reproductive system: functions of ovary and its hormones (estrogen and progesterone) ; hormonal regulation by hypothalamic pituitary gonadal (HPG axis)	K	KH	Y	LGT SGT , Student Seminar	Written/Viva voce	
PY9.5	Discuss the menstrual cycle, uterine and ovarian changes, hormonal regulation and its implications in reproductive physiology	K	KH	Y	LGT SGT, ECE	Written/Viva voce	

PY9.6	Enumerate male and female contraceptive methods, rationale of its prescription, side effects and its advantages & disadvantages	K	KH	Y	LGT SGT, ECE,SDL	Written/Viva voce	
PY9.7	Discuss the physiology of pregnancy, parturition & lactation.	K	KH	Y	LGT SGT, Flipped Classroom	Written/Viva voce	
PY9.8	Discuss the physiological basis of various pregnancy tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.9	Discuss the hormonal changes and their effects during perimenopause and menopause	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.10	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	K	KH	Y	LGT SGT, visit to IVF lab	Written/Viva voce	
	Topic 10: Central Nervous System Physiology	**Number of competencies: (20)**				**Number of competencies that require certification : (02)**	
PY10.1	Describe and discuss the functional organization of central nervous system (brain and spinal cord)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.2	Describe the functional anatomy of peripheral nervous system (including autonomic nervous system)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.3	Classify the neurotransmitters and discuss the chemical transmission in the nervous system.	K	KH	Y	LGT SGT	Written/Viva voce	
Number	**COMPETENCY The student should be able to:**	**Predominant Domain K/S/A/C**	**Level K/KH / SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
PY10.4	Discuss the classification, functions and properties of synapse	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY10.5	Discuss the classification, functions and properties of reflex	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY10.6	Discuss the classification, functions and properties of receptors	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY10.7	Discuss somatic sensations, ascending tracts, (sensory tracts) and applied aspects of sensory system	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.8	Discuss Physiology of pain including pain pathways and its modulation with special emphasis on gate control theory of pain	K	KH	Y	LGT SGT, visit to pain clinic	Written/Viva voce	
PY10.9	Describe the course of descending tracts (pyramidal and extra pyramidal), its clinical implications including difference in Upper motor neuron (UMN)and lower motor	K	KH	Y	LGT SGT	Written/Viva voce	

	neuron (LMN) lesions						
PY10.10	Discuss types and clinical features of spinal cord lesions (complete, incomplete transection and hemisection - Brown Sequard syndrome)	K	KH	Y	LGT SGT, Tutorials, ECE	Written/Viva voce	
PY10.11	Describe functional anatomy of cerebellum, its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.12	Discuss functional anatomy of basal ganglia , its connections, functions and Clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.13	Discuss the mechanism of maintenance of tone, posture and control of body movements	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY10.14	Discuss functional anatomy of thalamus , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.15	Discuss functional anatomy of hypothalamus and limbic system , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.16	Discuss functional anatomy of cerebral cortex, its connections, functions and Clinical abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.17	Discuss the structure and functions of reticular activating system, sleep physiology and EEG waveforms during sleep wake cycle	K	KH	Y	LGT SGT, visit to sleep lab	Written/Viva voce	
Number	**COMPETENCY The student should be able to:**	**Predominant Domain K/S/A/C**	**Level K/KH/ SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
PY10.18	Discuss the physiological basis of memory, learning and speech and clinical alterations in speech	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.19	Obtain relevant history and conduct correct General and Clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	4 (each)
PY10.20	Obtain relevant history and conduct correct General and Clinical examination of the cranial nerves in a normal volunteer or simulated environment	S	P	Y	DOAPs	OSCE/Viva voce	1 (each)
	Topic 11: Special Senses	**Number of competencies: (7)**				**Number of competencies that require certification : (NIL)**	
PY11.1	Describe and discuss physiology of smell and its applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	

PY11.2	Describe and discuss physiology of taste sensation and applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.3	Describe and discuss functional anatomy of ear and auditory pathways, vestibular apparatus and equilibrium	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.4	Discuss physiology of hearing, pathophysiology of deafness and hearing tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.5	Discuss functional anatomy of eye, visual pathway, light and pupillary reflex and clinical implication of lesions in visual pathway	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.6	Discuss physiology of image formation, refractive errors and physiological principles of its management	K S	P	Y	LGT SGT ECE	Written/Viva voce	
PY11.7	Discuss physiology of vision including colour vision and colour blindness	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
	Topic 12: Integrated Physiology **Number of competencies: (10)** **Number of competencies that require certification : (NIL)**						
PY12.1	Describe physiological mechanism of temperature regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.2	Discuss adaptation to altered temperature (heat and cold) and mechanism of fever, cold injuries and heat stroke	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.3	Discuss cardio-respiratory and metabolic adjustments during exercise (isometric and isotonic), effects of physical training under different environmental conditions (heat and cold)	K	KH	Y	LGT SGT	Written/Viva voce	

COMPETENCY BASED UNDERGRADUATE CURRICULUM FOR THE INDIAN MEDICAL GRADUATE

2024

National Medical Commission
Pocket-14, Sector- 8, Dwarka
New Delhi 110 077

COMMUNITY MEDICINE (CODE: CM)

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
COMMUNITY MEDICINE (Topics:20 Competencies: 136)							
Topic 1: Concept of Health and Disease Number of competencies:(10) Number of competencies that require certification :(NIL)							
CM1.1	Define and describe the concept of Public Health	K	KH	Y	LGT, SGT	Written/Viva-voce	
CM1.2	Define health; describe the concept of holistic health including concept of spiritual health and the relativeness & determinants of health	K	KH	Y	LGT, SGT	Written/Viva-voce	
CM1.3	Describe the characteristics of agent, host and environmental factors in health and disease and the multifactorial etiology of disease	K	KH	Y	LGT, SGT	Written/Viva-voce	
CM1.4	Describe and discuss the natural history of disease	K	KH	Y	LGT, SGT	Written/Vova voce	
CM1.5	Describe the application of interventions at various levels of prevention	K	KH	Y	LGT, SGT	Written/Vova voce	
CM1.6	Describe and discuss the concepts, the principles of Health promotion and Education, IEC and Behavioral change communication (BCC)	K	KH	Y	LGT, SGT	Written/viva-voce	
CM1.7	Enumerate and describe health indicators	K	KH	Y	LGT, SGT	Written/Vova voce	
CM1.8	Describe the Demographic profile of India and discuss its Impact on health	K	KH	Y	LGT, SGT	Written/Vova voce	
CM1.9	Demonstrate the role of effective Communication skills in health in a simulated environment	S	SH	Y	DOAP, FAP Clinical posting	Skill assessment /OSCE	
CM1.10	Demonstrate the Important aspects of the doctor patient relationship in a simulated environment	S	SH	Y	DOAP, FAP Clinical posting	Skill assessment /OSCE	
Topic 2: Relationship of social and behavioural to health and disease Number of competencies:(5) Number of competencies that require certification:(2)							
CM2.1	Describe the steps and perform clinico-socio-cultural and demographic assessment of the individual, family and community	S	SH	Y	LGT, SGT, DOAP FAP Clinical posting	Written/Vova voce/ Skill assessment	5

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
CM2.2	Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status	S	SH	Y	LGT, SGT, DOAP FAP Clinical posting	Written/Vova voce/ Skill assessment /OSCE	5
CM2.3	Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior	S	SH	Y	LGT, SGT, DOAP FAP Clinical posting	Written/Vova voce/ Skill assessment /OSCE	
CM2.4	Describe social psychology, community behaviour and community relationship and their impact on health and disease	K	KH	Y	LGT, SGT, FAP Clinical posting	Written/Vova voce	
CM2.5	Describe poverty and social security measures and its relationship to health and disease	K	KH	Y	LGT, SGT, FAP Clinical posting	Written/Vova voce	
Topic 3: Environmental Health Problems		**Number of competencies:(08)**			**Number of competencies that require certification:(NIL)**		
CM3.1	Describe the health hazards of air, water, noise, radiation and pollution	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM3.2	Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting	K	KH	Y	LGT, SGT, DOAPFAP Clinical posting	Written/Vova voce	
CM3.3	Describe the aetiology and basis of water borne diseases /jaundice /hepatitis /diarrheal diseases	K	KH	Y	LGT, SGT, DOAPFAP Clinical posting	Written/Vova voce	
CM3.4	Describe the concept of solid waste, human excreta and sewage disposal	K	KH	Y	LGT, SGT	Written/Vova voce	
CM3.5	Describe the standards of housing and the effect of housing on health	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM3.6	Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne Disease Control Program	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	

CM3.7	Identify and describe the identifying features and life cycles of vectors of Public Health Importance and their control measures	S	SH	Y	LGT, SGT, DOAPFAP Clinical posting	Written/Vova voce/ Skill assessment / OSCE	
Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH/ SH/P**	**Core Y/N**	**Suggested Teaching learning methods**	**Suggested Assessment methods**	**Number required to certify P**
CM3.8	Describe the mode of action, application cycle of commonly used insecticides and rodenticides	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
Topic 4: Principles of health promotion and education Number of competencies:(4)Number of competencies that require certification:(01)							
CM4.1	Describe various methods of health education with their advantages and limitations	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM4.2	Describe the methods of organizing health promotion and education and counselling activities at individual family and community settings	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM4.3	Demonstrate and describe the steps in evaluation of health promotion and education program	S	SH	Y	SGT, DOAPFAP Clinical posting	Written/Vova voce/ Skill assessment /OSCE	
CM 4.4	Conduct a health education session for community awareness in a simulated environment/FAP/clinical posting	S	SH	Y	SGT, DOAPFAP Clinical posting	Written/Vova voce/ Skill assessment /OSCE	1
Topic 5: Nutrition Number of competencies:(22) Number of competencies that require certification:(5)							
CM5.1	Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological Conditions	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM5.2	Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method	S	SH	Y	DOAP, FAP Clinical posting	Skill assessment /OSCE	
CM5.3	Define and describe common nutrition related health disorders (including macro-PEM, Micro-iron, Zn, iodine, Vit A), their control and management	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	

CM5.4	Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc., in a simulated environment	S	SH	Y	DOAP, FAP Clinical posting	Skill assessment /OSCE	
Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH/ SH/P**	**Core Y/N**	**Suggested Teaching learning methods**	**Suggested Assessment methods**	**Number required to certify P**
CM5.5	Describe the methods of nutritional surveillance principles nutritional education and rehabilitation in the context of socio-cultural factors.	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM5.6	Enumerate and discuss the National Nutrition Policy, important national nutritional Programs including the Integrated Child Development Services Scheme (ICDS) etc.,	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM5.7	Describe food hygiene	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce FAP Clinical posting	
CM5.8	Describe and discuss the importance and methods of food fortification and effects of additives and adulteration	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM5.9	Perform nutritional assessment of individual, family and community using appropriate method and plan a diet for health promotion based on the assessment	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5
CM 5.10	Recommend a dietary plan for a person with DM/ HTN/ Obesity in a simulated environment/FAP/Clinical posting	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5
CM5.11	Plan a diet for an adult which meets the protein (macro nutrients) requirements as per latest RDA-NIN guidelines for vegetarian/ ovo-vegetarian/non-vegetarian	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5
CM5.12	Demonstrate different types of breastfeeding holds, latching, manual expression of breast milk using a baby model and breast model.	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5
CM 5.13	Counsel a mother about complementary feeding for different age groups of the child covering the 8 dietary diversity	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5

	food groups, quantity, frequency, consistency of the food.						
CM 5.14	Demonstrate an awareness of their own personal health and nutrition	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.15	Demonstrate knowledge of the role of nutrition in health promotion and disease prevention	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.16	Have knowledge of breast feeding and complementary feeding Practices	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
CM 5.17	Ability to counsel mothers on breast feeding with focus on attachment to breast and correct position of the newborn	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.18	Ability to counsel mothers on complementary feeding using National guidelines while being sensitive of cultural and socioeconomic influences	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.19	Assess the nutritional content of processed foods learning to understand labels, and empower patients to make informed nutritional decisions.	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.20	Counsel for diet modification for a diabetic/ hypertensive/obese individual	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.21	Plan and conduct a health education session on nutrition in NCD clinic / in community	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 5.22	Counsel mother on breast feeding and complementary feeding	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 6: Basic statistics and its applications require certification:(1)		**Number of competencies:(06)**					**Number of competencies that**
CM6.1	Formulate research question for a study	K	KH	Y	SGT, LGT, DOAP	Written/Vova voce/ Skill assessment	
CM6.2	Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data	S	SH	Y	SGT, LGT, DOAP	Written/Vova voce/ Skill assessment/OSCE	

CM6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs	S	SH	Y	SGT, LGT, DOAP	Written/Vova voce/ Skill assessment/OSCE	
CM6.4	Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion	S	SH	Y	SGT, LGT, DOAP	Written/Vova voce/ Skill assessment/OSCE	
CM 6.5	Able to understand use of statistical software for the data analysis	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 6.6	Perform descriptive statistics of a given data-set and interpret	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	5

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
Topic 7: Epidemiology **Number of competencies:(11)** **Number of competencies that require certification: (01)**							
CM7.1	Define Epidemiology and describe and enumerate the principles, concepts and uses	K	KH	Y	SGT, LGT	Written/Vova voce	
CM7.2	Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and non-communicable diseases	K	KH	Y	SGT, LGT	Written/Vova voce	
CM7.3	Enumerate, describe and discuss the sources of epidemiological data	K	KH	Y	SGT, LGT	Written/Vova voce	
CM7.4	Define, calculate and interpret morbidity and mortality indicators based on given set of data	S	SH	Y	SGT, DOAP	Written/Skill assessment, OSCE	5
CM7.5	Enumerate, define, describe and discuss epidemiological study designs	K	KH	Y	SGT, LGT	Written/Vova voce	
CM7.6	Enumerate and evaluate the need of screening tests	S	SH	Y	SGT, DOAP	Written/Skill Assessment	
CM7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control	S	SH	Y	SGT, DOAP	Written/Skill assessment /OSCE	

	measures						
CM7.8	Describe the principles of association, causation and biases in epidemiological studies	K	KH	Y	SGT, LGT	Written/Vova voce	
CM7.9	Describe and demonstrate the application of computers in epidemiology	S	KH	Y	SGT, DOAP	Written	
CM 7.10	Able to demonstrate development of research proposal	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
CM 7.11	Able to demonstrate the skills for critically appraise the research articles or research data	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 8: Epidemiology of communicable and non- communicable diseases Number of competencies:(07) Number of competencies that require certification:(NIL)							
CM8.1	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
CM8.2	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for non-communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM8.3	Enumerate and describe disease specific National Health Programs including their prevention and treatment of a case	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM8.4	Describe the principles and enumerate the measures to control a disease epidemic	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM8.5	Describe and discuss the principles of planning, Implementing and evaluating control measures for disease at community level bearing in mind the public	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	

	health importance of the disease						
CM8.6	Educate and train health workers in disease surveillance, control & treatment and health education	S	SH	Y	DOAP FAP Clinical posting	Skill assessment /OSCE	
CM8.7	Describe the principles of management of information systems	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
Topic 9: Demography and vital statistics		**Number of competencies:(07)**			**Number of competencies that require certification:(NIL)**		
CM9.1	Define and describe the principles of Demography, Demographic cycle, Vital statistics	K	KH	Y	SGT, LGT	Written/Vova voce	
CM9.2	Define, calculate and interpret demographic indices including birth rate, death rate, fertility rates	S	SH	Y	LGT, SGT, DOAP	Skill assessment /OSCE	
CM9.3	Enumerate and describe the causes of declining sex-ratio and its social and health Implications	K	KH	Y	SGT, LGT	Written/Vova voce	
CM9.4	Enumerate and describe the causes and consequences of population explosion and population dynamics of India.	K	KH	Y	SGT, LGT	Written/Vova voce	
CM9.5	Describe the methods of population control	K	KH	Y	SGT, LGT	Written/Vova voce	

Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH / SH/P**	**Core Y/N**	**Suggested Teaching learning methods**	**Suggested Assessment methods**	**Number required to certify P**
CM9.6	Describe the National Population Policy	K	KH	Y	SGT, LGT	Written/Vova voce	
CM9.7	Enumerate the sources of vital statistics including census, SRS, NFHS, NSSO etc	K	KH	Y	SGT, LGT	Written/Vova voce	
Topic 10: Reproductive maternal and child health		**Number of competencies:(10)**			**Number of competencies that require certification:(NIL)**		
CM10.1	Describe the current status of Reproductive, maternal, newborn and Child Health	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	

CM10.2	Enumerate and describe the methods of screening high-risk groups and common health problems	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.3	Describe local customs and practices during pregnancy, child birth, lactation and child feeding practices	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.4	Describe their productive, maternal, newborn &child health (RMCH); child survival and safe motherhood interventions	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.5	Describe Universal Immunization Program; Integrated Management of Neonatal and Childhood Illness (GMNCI) and other existing Programs.	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.6	Enumerate and describe various family planning methods, their advantages and shortcomings	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.7	Enumerate and describe the basis and principles of the Family Welfare Program including the organization, technical and operational aspects	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM10.8	Describe the physiology, clinical management and principles of adolescent health including ARSH	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce FAP Clinical posting	
CM10.9	Describe and discuss gender issues and women empowerment	K	KH	Y	SGT, LGT FAP Clinical posting	Written/Vova voce	
CM 10.10	Able to manage the health care services for reproductive and child care services under supervision	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 11: Occupational Health **Number of competencies:(06)** **Number of competencies that require certification: (NIL)**							
CM11.1	Enumerate and describe the presenting features of patients with occupational illness including agriculture	K	KH	Y	SGT, LGT	Written/Vova voce	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning methods	Suggested Assessment methods	Number required to certify P
CM11.2	Describe the role, benefits and functioning of the employees' state insurance scheme	K	KH	Y	SGT, LGT	Written/Vova voce	

CM11.3	Enumerate and describe specific occupational health hazards, their risk factors and preventive measures	K	KH	Y	SGT, LGT	Written/Vova voce	
CM11.4	Describe the principles of ergonomics in health preservation	K	KH	Y	SGT, LGT	Written/Vova voce	
CM11.5	Describe occupational disorders of health professionals and their prevention & management	K	KH	Y	SGT, LGT	Written/Vova voce	
CM 11.6	Able to manage the occupational health services at factory or industry level in a simulated environment	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 12: Geriatric services		**Number of competencies:(05)**				**Number of competencies that require certification:(NIL)**	
CM12.1	Define and describe the concept of Geriatric services	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM12.2	Describe health problems of aged population	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM12.3	Describe the prevention of health problems of aged population	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM12.4	Describe National program for elderly	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 12.5	Able to identify the health needs to elderly individuals at the earliest	S	SH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce/OSCE	
Topic 13:	**Disaster Management Number of competencies:(05)**				**Number of competencies that require certification:(NIL)**		
CM13.1	Define and describe the concept of Disaster management	K	KH	Y	LGT, SGT	Written/Vova voce	
CM13.2	Describe disaster management cycle	K	KH	Y	LGT, SGT	Written/Vova voce	
CM13.3	Describe man-made disasters in terworld And in India	K	KH	Y	LGT, SGT	Written/Vova voce	
CM13.4	Describe the details of the National Disaster management Authority	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 13.5	Able to understand the management of handing a disaster in a simulated environment	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	

Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH/ SH/**	**Core Y/N**	**Suggested Teaching learning methods**	**Suggested Assessment methods**	**Number required to certify P**

			P				
Topic 14: Hospital waste management Number of competencies:(04) Number of competencies that require certification:(NIL)							
CM14.1	Define and classify hospital waste	K	KH	Y	LGT, SGT, visit to hospital	Written/Vova voce	
CM14.2	Describe various methods of treatment of hospital waste	K	KH	Y	LGT, SGT, visit to hospital	Written/Vova voce	
CM14.3	Describe laws related to hospital waste management	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 14.4	Able to segregate the various hospital waste	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 15: Mental Health Number of competencies:(04)		**Number of competencies that require certification: (NIL)**					
CM15.1	Define and describe the concept of mental Health	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM15.2	Describe warning signals of mental health disorder	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM15.3	Describe National Mental Health program	K	KH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce	
CM 15.4	Able to recognise the mental issues among individuals, families and communities at the earlier stages	S	SH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce/OSCE	
Topic 16: Health planning and management		**Number of competencies:(05)**			**Number of competencies that require certification:(NIL)**		
CM16.1	Define and describe the concept of Health planning	K	KH	Y	LGT, SGT	Written/Vova voce	
CM16.2	Describe planning cycle	K	KH	Y	LGT, SGT	Written/Vova voce	
CM16.3	Describe Health management techniques	K	KH	Y	LGT, SGT	Written/Vova voce	
CM16.4	Describe health planning in India and National policies related to health and health planning	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 16.5	Demonstrate understanding of concepts of Health planning in India, various health care economics analysis	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	

Topic 17: Health care of the community	**Number of competencies:(06)**			**Number of competencies that require certification: (NIL)**			
CM17.1	Define and describe the concept of health care to community	K	KH	Y	LGT, SGT	Written/Vova voce	
CM17.2	Describe community diagnosis	K	KH	Y	LGT, SGT	Written/Vova voce	
Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH/SH/P**	**Core Y/N**	**Suggested Teaching learning methods**	**Suggested Assessment methods**	**Number required to certify P**
CM17.3	Describe primary health care, its components and principles	K	KH	Y	LGT, SGT	Written/Vova voce	
CM17.4	Describe National policies related to health and health planning and millennium development goals	K	KH	Y	LGT, SGT	Written/Vova voce	
CM17.5	Describe healthcare delivery in India	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 17.6	Demonstrate understanding of health system functioning in India	S	SH	Y	LGT, SGT, FAP Clinical posting	Written/Vova voce/OSCE	
Topic 18: International Health	**Number of competencies:(3)**			**Number of competencies that require certification (NIL)**			
CM18.1	Define and describe the concept of international health	K	KH	Y	LGT, SGT	Written/Vova voce	
CM18.2	Describe roles of various international health agencies	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 18.3	Demonstrate understanding role of various international and national agencies in health & disease with prevention of emergence and re- emergence of diseases and prevention of pandemic and handling the Pandemic	S	SH	Y	LGT, SGT	Written/Vova voce/OSCE	
Topic 19: Essential Medicine	**Number of competencies:(04)**			**Number of competencies that require certification:(NIL)**			
CM19.1	Define and describe the concept of Essential Medicine List (EML)	K	KH	Y	LGT, SGT	Written/Vova voce	
CM19.2	Describe roles of essential medicine in primary health care	K	KH	Y	LGT, SGT	Written/Vova voce	
CM19.3	Describe counterfeit medicine and its prevention	K	KH	Y	LGT, SGT	Written/Vova voce	
CM19.4	Demonstrate understanding of mechanism of identifying and calculation of requirements of various medicines and essential medicine at primary health care	S	SH	Y	LGT, SGT FAP Clinical posting	Written/Vova voce/OSCE	

Topic 20:	Recent advances in Community Medicine	Number of competencies:(04)			Number of competencies that require certification:(NIL)		
CM20.1	List Important public health events of last five years	K	KH	Y	LGT, SGT	Written/Vova voce	
CM20.2	Describe various issues during outbreaks and their prevention	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 20.3	Describe any event important to Health of the Community	K	KH	Y	LGT, SGT	Written/Vova voce	
CM 20.4	Demonstrate awareness about laws pertaining to practice of community medicine	K	KH	Y	LGT, SGT	Written/Vova voce	

COMPETENCY BASED UNDERGRADUATE CURRICULUM FOR THE INDIAN MEDICAL GRADUATE

2024

National Medical Commission
Pocket-14, Sector- 8, Dwarka
New Delhi 110 077

BIOCHEMISTRY (CODE: BC)

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
BIOCHEMISTRY (Topics = 14, Competencies = 84)							
	Topic 1: Basic Biochemistry	**Number of competencies:(01)**			**Number of competencies that require certification:(NIL)**		
BC1.1	Describe the molecular and functiona organization of a cell and its sub-cellular components and compositior and functions of Biologica membranes.	K	KH	Y	LGT, SGT / **SDL**	Written assessment/ Viva voce	
	Topic 2: Enzyme	**Number of competencies:(05)**			**Number of competencies that require certification:(NIL)**		
BC2.1	Explain fundamental concepts of enzyme, isoenzyme and coenzyme. Enumerate the main classes of IUBMB nomenclature.	K	KH	Y	LGT, **SGT**	Written assessment / Viva voce	
BC2.2	Describe and explain the basic principles of enzyme activity	K	KH	Y	LGT, **SGT**	Written assessment / Viva voce	
BC2.3	Describe and discuss enzyme Inhibition and role of enzymes or drugs as Inhibitors, and enzymes as therapeutic agents.	K	KH	Y	LGT, Case discussion SGT	Written assessment / Viva voce	
BC2.4	Describe and discuss the clinical utility of various serum enzymes in laboratory and their use as markers of various pathological conditions.	K	KH	Y	LGT, SGT, Flipped class room	Written assessment / Viva voce	
BC2.5	Interpret laboratory results of enzymes in various disorders.	K	KH	Y	SGT, DOAPs, Case Studies	Written assessment/ Viva voce/ Case studies, OSPE	
	Topic 3: Chemistry and Metabolism of Carbohydrates	**Number of competencies:(06)**			**Number of competencies that require certification:(NIL)**		

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
BC3.1	Discuss and differentiate monosaccharides, di-saccharides and polysaccharides with examples, their importance as energy fuel structural element, and storage molecule in human body.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC3.2	Describe the digestion, absorption and transport of carbohydrates from food along with its disorders.	K	KH	Y	LGT, SGT, SDL	Written/Viva-voce	
BC3.3	Define and briefly describe the pathways of carbohydrate metabolism and their regulation (glycolysis, gluconeogenesis, TCA, and significance of glycogen metabolism and HMP shunt), with associated disorders.	K	KH	Y	LGT, SGT, Flipped class room	Written/Viva voce	
BC3.4	Describe and discuss the regulation, functions and integration of minor Carbohydrate Metabolism pathway briefly along with associated diseases /disorders.	K	KH	Y	LGT, SGT	Written/Viva-voce	
BC3.5	Discuss the mechanism and significance of blood glucose regulation (Glucose homeostasis) in health and disease. Describe the types, Biochemical changes, complications and laboratory investigations related to diabetes & other carbohydrate metal disorders.	K	KH	Y	LGT, SGT, Flipped class room	Written/Viva voce	
BC3.6	Interpret the results of analytes associated with metabolism of carbohydrates and other laboratory investigations related to disorders of carbohydrate metabolism.	K	KH	Y	LGT, SGT Case Studies / SDL, Flipped class room	Written/ Viva voce/ Case Studies /OSPE	

	Topic 4 : Chemistry and Metabolism of Lipids require certification:(NIL)		**Number of competencies: (08)**				**Number of competencies that**
BC4.1	Describe and discuss main classes of lipids and their functions.	K	KH	Y	LGT, SGT /SDL	Written/Viva voce	
BC4.2	Describe the digestion and absorption of dietary lipids and its (associated disorders.	K	KH	Y	LGT, SGT /SDL	Written /Viva voce	
BC4.3	Describe and discuss the fatty acid oxidation, metabolism of ketone bodies along with their clinical significance.	K	KH	Y	LGT, SGT	Written /Viva voce	

Number	**COMPETENCY The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
BC4.4	Describe metabolism of Triglycerides and cholesterol metabolism along with its regulation and clinical significance.	K	KH	Y	LGT, SGT	Written /Viva voce	
BC4.5	Describe the metabolism of lipoproteins with brief overview of lipoprotein structure, their interrelations & atherosclerosis.	K	KH	Y	LGT, SGT	Written /Viva voce	
BC4.6	Discuss Biological role and therapeutic applications of Eicosanoids and their Inhibitors.	K	KH	Y	LGT, SGT, Flipped class room	Written /Viva voce	
BC4.7	Describe Fatty liver, cholelithiasis and obesity.	K	KH	Y	LGT, SGT, Case Studies/Scenarios/SDL	Written /Viva voce	
BC4.8	Interpret laboratory results of analytes associated with metabolism of lipids	K	KH	Y	LGT, SGT, case studies, Flipped class room	Written/Viva voce/ case studies/OSPE	
	Topic 5: Chemistry & Metabolism of Proteins and Immunology Number of competencies:(09)						**Number of competencies that**

	require certification:(NIL)						
BC5.1	Discuss briefly structure of amino acids and classify amino acids on the basis of Nutritional and Metabolic significance.	K	KH	Y	LGT, SGT/SDL	Written / Viva voce	
BC5.2	Discuss classification of proteins, structural organization, functions and clinical aspects.	K	KH	Y	LGT, SGT	Written / Viva voce	
BC 5.3	Describe the digestion and absorption of dietary proteins	K	KH	Y	LGT, SGT / SDL	Written / Viva voce	
BC 5.4	Describe plasma proteins and their functions and brief overview of normal and abnormal electrophoretic pattern of serum proteins, acute phase proteins.	K	KH	Y	LGT, SGT	Written / Viva voce	
BC 5.5	Describe the structure, functions and disorders of Immunoglobulins with brief description of cellular and humoral Immunity.	K	KH	Y	LGT, SGT	Written / Viva voce	

Number	**COMPETENCY The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/SH/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
BC 5.6	Describe the formation, transport, detoxification of Ammonia, Ammonia toxicity and its clinical significance.	K	KH	Y	LGT, SGT	Written / Viva voce	
BC 5.7	Describe the specialized products formed from the amino acids Glycine Phenylalanine, Tyrosine, Tryptophan, and Methionine, branched chain amino acids and Arginine and the inborn errors associated with them Discuss new-born screening.	K/S	KH/SH	Y	LGT, SGT	Written / Viva voce	
BC5.8	Describe the structure and functions of haem in the body and describe the processes involved in its metabolism with emphasis on jaundice and describe porphyrin metabolism.	K	KH	Y	LGT, SGT	Written / Viva voce	

BC5.9	Describe the major types of Hemoglobin and its types, derivatives & variants found in the body and their physiological / pathological relevance	K	KH	Y	LGT, SGT	Written / Viva voce	
Topic 6: Extracellular Matrix require certification: (NIL)			**Number of competencies: (03)**			**Number of competencies that**	
BC6.1	Enumerate the functions and components of the extracellular matrix (ECM).	K	KH	Y	LGT, SGT	Written/Viva voce	
BC6.2	Discuss the involvement of ECM components in health and disease.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC6.3	Describe protein targeting & sorting along with its associated disorders.	K	KH	N	LGT, SGT	Written/Viva voce	
Topic 7: Integration of Metabolism and Biological Oxidation require certification: (NIL)			**Number of competencies: (02)**			**Number of competencies that**	
BC7.1	Describe the integration of various metabolic processes in the body (Carbohydrate, Lipid, and Protein).	K	KH	Y	LGT, SGT	Written/viva voce	
BC7.2	Describe the Biochemical processes involved in generation of energy in cells.	K	KH	Y	LGT, SGT	Written/Viva voce	
Topic 8: Vitamins and Nutrition require certification: (NIL)			**Number of competencies: (06)**			**Number of competencies that**	

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
BC8.1	Describe the Biochemical role of vitamins in the body and explain the manifestations of their deficiency	K	KH	Y	LGT, SGT	Written/Viva voce	
BC8.2	Discuss the importance of various dietary components and explain importance of dietary fibre.	K	KH	Y	LGT, SGT, SDL	Written/Viva voce	
BC8.3	Describe the types and causes of protein energy malnutrition and its effects.	K	KH	Y	LGT, SGT	Written/Viva voce	

BC8.4	Provide dietary advice for optimal health in childhood and adult in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.	K/S/C	KH	Y	LGT, SGT / role play	Written/Viva voce	
BC8.5	Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obese / metabolic syndrome	K	KH	Y	LGT, SGT	Written/Viva voce	
BC8.6	Summarize the nutritional importance of commonly used items of food including fruits and vegetables (macro-molecules & its importance).	K	KH	Y	LGT, SGT, Home assignment	Written/Viva voce	
	Topic 9: Minerals, electrolytes, Water and Acid base balance Number of competencies: (03) Number of competencies that require certification: (NIL)						
BC9.1	Describe the dietary sources, absorption, transport, and metabolism, Biochemical functions of Iron, Calcium and copper with its associated clinical disorders.	K	KH	Y	LGT, SGT, Home Assignment, Flipped class room	Written/Viva voce	
BC9.2	Discuss Magnesium, Zinc and Phosphorus along with its clinical significance and discuss the functions of trace elements	K	KH	Y	LGT, SGT, Home Assignment. / SDL	Written/Viva voce	
BC9.3	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with them	K	KH	Y	LGT, SGT / SDL	Written/Viva voce	

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
	Topic 10: Molecular Biology			**Number of competencies:(07)**			**Number of competencies that require certification:(NIL)**
BC10.1	Describe nucleotides and nucleic acids and their clinical significance.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC10.2	Describe briefly synthesis of purines in the body with special stress on salvage pathway.	K	KH	N	LGT, SGT /SDL	Written/Viva voce	
BC10.3	Describe the degradation of purines and its significance with associated disorders.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC10.4	Describe in brief the major steps involved in Replication, Transcription, and translation.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC 10.5	Describe the types of DNA repair, gene mutations and associated disorders.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC10.6	Describe basic mechanism of regulation of gene expression	K	KH	Y	LGT, SGT /SDL	Written/Viva voce	
BC10.7	Describe applications of molecular technologies like recombinant DNA technology and PCR in the diagnosis and treatment of diseases. Briefly discuss microarray, FISH, CRISPR	K	KH	Y	LGT, SGT, Flipped class room	Written/Viva voce	
	Topic 11: Organ Function tests and Hormones			**Number of competencies:(02)**			**Number of competencies that require certification:(NIL)**
BC 11.1	Describe the function tests of kidney, liver, thyroid and adrenal glands and their clinical significance. Interpret the function tests report.	K,S	KH/SH	Y	LGT, SGT, Case studies / SDL	Written/Viva voce/Case studies/OSPE	

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
BC11.2	Enumerate the hormones and markers related to reproduction and reproductive health and their clinical interpretation (For e.g. LH, FSH, Prolactin, beta-HCG, Estrogen Progesterone, testosterone and AMH. Discuss importance of prenatal screening.	K	KH	Y	LGT, SGT / SDL, Flipped class room	Written/Viva voce/Direct observation/ OSPE	
	Topic 12: Xenobiotic, oxidative stress and antioxidants		**Number of competencies:(03)**			**Number of competencies that require certification:(NIL)**	
BC12.1	Describe the role of xenobiotics in disease in health and disease	K	KH	Y	LGT, SGT	Written/Viva voce	
BC12.2	Describe the anti-oxidant defense systems in the body.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC12.3	Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis	K	KH	Y	LGT, SGT / SDL	Written/Viva voce	
	Topic 13: Miscellaneous		**Number of competencies:(05)**			**Number of competencies that require certification:(NIL)**	
BC 13.1	Describe oncogenesis, oncogenes & its activation with focus on p53 & apoptosis.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC 13.2	Describe various Biochemical tumor markers and the Biochemical basis of cancer therapy.	K	KH	Y	LGT, SGT	Written/Viva voce	
BC13.3	Discuss briefly on HIV and Biochemical changes in AIDS.	K	KH	N	LGT, SGT	Written/Viva voce	
BC13.4	Discuss metabolism of alcohol with Biochemical changes and effects of chronic alcoholism.	K	KH	Y	LGT, SGT, SDL	Written/Viva voce	

BC13.5	Describe the role of Artificial Intelligence in clinical Biochemistry laboratory practices.	K	KH	N	LGT, SGT / SDL	Written/ Viva voce Logbook Record	
Number	**COMPETENCY The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/S H/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
Topic 14: Biochemical Laboratory test / Practical Number of competencies: (24) Number of competencies that require certification: (11)							
14.1	Describe commonly used laboratory apparatus equipments, good / safe laboratory practice, Biomedical hazards & waste management.	K	KH	Y	LGT, SGT	Written/ Viva voce/ Direct observation	
BC14.2	Describe estimation of pH by pH meter or ABG analyser and interpretation of results with paper case scenarios.	K	KH	Y	LGT, SGT / Case discussion	Written/ Viva voce Direct observation/ OSPE	
BC14.3	Describe the physical properties, chemical constituents of normal urine and abnormal constituents of urine and Perform urine analysis to determine normal and abnormal constituents (including dipsticks method demonstration).	K,S	KH/P	Y	LGT, Small group Discussion / DOAP	Written/ Viva voce / DOAP	2
BC14.4	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states and prepare a urine report.	S	P	Y	DOAPs	Skill assessment / OSPE	1
BC14.5	Describe screening of urine for inborn errors & describe the use of paper chromatography	K	KH	Y	LGT, SGT	Written/ Viva voce/ Direct observation/ OSPE	
BC14.6	Describe the principles of Colorimetry & Spectrophotometry.	K	KH	Y	LGT, SGT	Written / Viva voce / Direct	

						observation	
BC14.7	Perform estimation of glucose by manual / semi-automated analyzer method and demonstrate glucometer usage. and interpretation of results with clinical scenarios.	S	P	Y	DOAPs	Skill Assessment OSPE	1
BC14.8	Perform estimation of urea and calculate BUN and interpretation of results in clinical scenarios.	S	P	Y	DOAPs	Skill Assessment OSPE	1

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certifyP
BC14.9	Perform the estimation of serum creatinine and calculate creatinine clearance.	S	P	Y	DOAP	Skill Assessment OSPE	1
BC14.10	Perform estimation of uric acid in serum and interpretation of results with clinical scenarios.	S	P	Y	DOAPs	Skill Assessment OSPE	1
BC14.11	Perform estimation of serum proteins, albumin and A:G ratio	S	P	Y	DOAPs	Skill Assessment OSPE	1
BC14.12	Perform the estimation of serum total cholesterol	S	P	Y	DOAPs	Skill Assessment OSPE	1
BC14.13	Perform the estimation of serum Bilirubin by manual / semi-automated analyzer method.	S	P	Y	DOAP	Skills assessment / OSPE	1
BC14.14	Describe estimation of calcium and phosphorus and interpretation of results.	K	KH	Y	LGT, SGT, Demonstration	Written / Viva voce	
BC14.15	Describe the estimation Triglycerides, HDL and calculation of LDL and interpretation of results with clinical scenarios.	K	KH	Y	LGT, SGT	Written / Viva voce / OSPE (LDL Calculate)	

BC14.16	Describe the estimation of SGOT (AST) / SGPT (ALT) / Alkaline Phosphatase and interpretation of results with clinical scenarios.	K	KH	Y	LGT, SGT	Written/ Viva voce	
BC14.17	Describe briefly various body fluids & discuss the composition of CSF.	K	KH	Y	LGT, SGT	Written/ Viva voce	
BC14.18	Observe use of commonly used • pH meter • Paper chromatography of amino acid • Protein electrophoresis	K	KH	Y	Demonstration (SGT) & Lab Visit	Written/ Viva voce / Direct observation	

Number	**COMPETENCY** **The student should be able to**	**Predominant Domain K/S/A/C**	**Level K/KH/S H/P**	**Core (Y/N)**	**Suggested Teaching Learning method**	**Suggested Assessment method**	**Number required to certify P**
	• TLC, PAGE • Electrolyte analysis by ISE • ABG analyzer • ELISA • Immunodiffusion • Autoanalyser • DNA isolation from blood/ tissue						

BC14.19	Explain the basis and rationale of Biochemical tests done and interpretation of laboratory results in the following conditions: - Diabetes mellitus, - Obesity, - dyslipidaemia, - Fatty liver - myocardial infarction, - Renal failure, - Gout, - Nephrotic syndrome, - Jaundice, - Liver diseases, pancreatitis, disorders of acid- base balance, - Thyroid disorders, - Genetic disorders - Nutritional disorders - Vitamin deficiency disorders, - Disorders of Mineral metabolism, - Disorders of electrolyte metabolism.	K	KH	Y	LGT/ Clinical case studies discussion (SGT)	Written/ Viva voce / OSPE / Case studies interpretation	
BC14.20	Describe & Identify Pre-Analytical (especially order of draw, tourniquet technique), Analytical, Post Analytical errors.	S	SH	Y	LGT, SGT DOAP(clinical lab), Skill lab	Written/ Viva voce/ OSPE/ Direct observation/ OSPE	

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
BC14.21	Describe Quality control and identify basic L J charts in Clinical biochemistry lab.	S	SH	Y	LGT / SGT / DOAP (clinical lab)	Written/ Viva voce/ OSPE/ Direct observation/ OSPE	1
BC14.22	Describe performance of OGTT, Glucose Challenge Test and HbA1c and interpretation of results with clinical scenarios.	K	KH	Y	LGT, SGT	Written/ Viva voce/ OSPE /Direct observation/ Case studies interpretation.	
BC14.23	Calculate energy content of different food Items, identify food items with high and low glycaemic index and explain the importance of these in the diet.	K	KH	Y	LGT, SGT	Written/ Viva voce	
BC 14.24	Observe, Interpret and discuss the baseline, diagnostic, prognostic, and discharge investigations of clinical biochemistry.	K,A,S,C	SH	Y	ECE-SGT(Bedside/ Ward visit/ Medical record department	Logbook, reflections	