OBJECTIVES FOR PHYSIOLOGY COMPETENCIES

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration	Hours
PY 1.1	Describe the structure & function of mammalian cell	1. Describe the structure of cell membrane 2. Discuss different types of integral & peripheral proteins 3. Mention Intracellular organelles & their functions 4. Discuss about the Cytoskeleton 5 . Enumerate the functions of nucleus and other organelles	K	KH	Y	Lecture	Written				1
PY 1.2	Describe & discuss the principles of Homeostasis	1. Define and discuss Homeostasis 2. Describe the Controlling mechanisms	K	KH	Y	Lecture	Viva voce				1
PY 1.3	Describe intercellular communications	1. Describe the structure and function of the Integrins, cadherins (CAMs) 2. Describe the Gap junctions and Tight junctions	K	KH	Y	Lecture	Written				1

PY 1.4	Describe Apoptosis , Programmed cell death	1. Define Apoptosis 2. Discuss the different types of mechanisms involved. 3. Discuss the Factors affecting Apoptosis	K	KH	Y	Lecture	Written				1
PY 1.5	Describe & discuss transport mechanism across cell membrane	1. Enumerate different types of Active transport mechanisms 2. Describe in detail.	K	KH	Y	Lecture	Written				1
		2 Discuss different types of Passive transport	K	KH	Y	Lecture					1
PY 1.6	Describe the fluid compartment of body ionic composition & measurement	1. Outline Compositions of ICF & ECF 2. Discuss the methods of measurement of fluid compartments	K	KH	Y	Lecture	Written			Biochemis try	1
PY 1.7	Describe the concept of pH & buffer system in body	1. Define pH & Buffer 2. Discuss the different types of buffers to maintain pH	K	KH	Y	Lecture	Written			Biochemis try	1
PY 1.8	Describe & discuss the molecular basis of Resting membrane potential & Action potential in excitable tissue	1. Explain about generation of resting membrane potential 2. Explain the generation of action potential	K	KH	Y	Self Directed Learning	Written				1
PY 1.9	Demonstrate the ability to describe & discuss the method used to demonstrate the functions of the cell and its products,	1. Discuss the method used to demonstrate the functions of the cell 2. Describe the steps of patch clamp method and	K	KH	Y	Self Directed Learning	Written				1

	its communications & their application in clinical care & research	its use in clinical research									
PY 2.1	Describe the composition & functions of blood component	1. Discuss about blood Cells & Plasma 2. Discuss the functions of Blood	K	KH	Y	Self Directed Learning	Written				1
PY 2.2	Discuss the origin, forms, variations & functions of plasma proteins	1. Mention the origin & formation of plasma proteins 2. Explain the normal values & functions of plasma proteins	K	KH	Y	Lecture	Written				1
PY 2.3	Describe and discuss the synthesis & functions of haemoglobin & explain its break down. Describe variants of Haemoglobin	1. Explain the formation of Haemoglobin and iron metabolism	K	KH	Y	Lecture	Written				1
		2. Discuss breakdown of Haemoglobin and pathophysiology of jaundice 3. Mention different types of Haemoglobin, and their clinical significance	K	KH	Y	Lecture	Written				1
PY 2.4	Describe RBC formation (Erythropoiesis & its regulations) functions	1. Explain the Structure of bone marrow 2. Explain the steps of Erythropoiesis 3. Mention the Factors effecting Erythropoiesis	K	KH	Y	Lecture	Written				1
PY 2.5	Describe different types of anemias	1. Outline the classification of anemia	K	KH	Y	Lecture	Written		Pathology	Biochemistry	1

	and jaundice	2.Explain Iron deficiency, vitamin B_{12} & Folic acid anemia									
PY 2.6	Describe WBC formation & its regulation	1.Enumerate different types of WBC	K	KH	Y	Self Directed Learning	Written				1
		2. Discuss the steps of leucopoiesis 3. Mention the factors affecting leucopoiesis 4. Discuss the functions of granulocytes	K	KH	Y	Lecture	Written				1
PY 2.7	Describe the formation of platelets, functions & variations	1. Explain about thrombopoiesis & factors affecting it 2. Explain the functions of platelets	K	KH	Y	Lecture	Written				1
PY 2.8	Describe the physiological basis of hemostasis & anticoagulants, describe bleeding & clotting disorder (Hemophilia, purpura)	1. Define Hemostasis and 2. Describe the steps of Hemostasis	K	KH	Y	Lecture	Written		Pathology		1
		3. Discuss Bleeding and Clotting disorders 4. Explain Hemophilia & purpura	K	KH	Y	Lecture	Written				1
PY 2.9	Describe different Blood groups & discuss the clinical importance of blood grouping, blood banking & transfusion	1. Enumearte the different types of blood groups 2. Explain ABO & RH systems 3. Explain the Hazards of mismatched blood transfusion	K	KH	Y	Lecture	Written		Pathology		1

		4. Discuss Blood grouping & cross matching 5. Explain RH incompatibility	K	KH	Y	Lecture	Written / viva voce				1
PY 2.10	Define & classify different types of immunity. Describe the development of immunity & its regulations	1. Describe Innate immunity & Acquired immunity 2. Explain the Complement system	K	KH	Y	Lecture	Written				1
		3. Explain the functions of B-lymphocytes & T-lymphocytes 4. Discuss the disorders associated with immunity , Applied Aspects	K	KH	Y	Lecture	Written				1
PY 2.11	Estimate Hb, RBC, TLC, RBC indices, DLC, Blood groups BT/CT	1. Estimate Hb concentration by the Sahli's acid hematin method.	S	SH	Y	Practical	Viva voce				2
		2. Estimate the RBC Count	S	SH	Y	Practical	Viva voce				8
		3. Estimate the WBC Count	S	SH	Y	Practical	Viva voce				8
		4. Describe the normal corpuscular values and how to obtain them. Explain the clinical significance of calculating absolute corpuscular values.	S	SH	Y	Practical	Viva voce				2
		5. Prepare satisfactory blood films, fix and stain them, and describe the features of a well-stained	S	SH	Y	Practical	Viva voce				8

		film. 6. Identify different blood cells in a film, and indicate the identifying features of each type of leukocyte. 7. Differentiate between neutrophils, eosinophils, and basophils and between a large lymphocyte and a monocyte. 8. Carry out the differential count and express results in their percentages and absolute numbers.									
		9. Determine blood groups by using commercially available anti-sera, and precautions to be observed.	S	SH	Y	Practical	Viva voce				2
		10. Determine BT and CT by the routine laboratory methods, and give their normal values.	S	SH	Y	Practical	Viva voce				2
PY 2.12	Describe test for ESR osmotic fragility, Hematocrit, note the findings & interpret the test results etc.	1.Mention the tests for ESR	S	SH	Y	Practical	Viva voce				2
		2.Mention the test for osmotic fragility	S	SH	Y	Practical	Viva voce				2
PY 2.13	Describe steps for reticulocytes & platelet count	1.Estimate reticulocytes count	S	SH	Y	Practical	Viva voce				4
		2.Estimate platelet count	S	SH	Y	Practical	Viva voce				4

PY 3.1	Describe the structure & function of a neuron & Neuroglia. Discuss nerve growth factor & other growth factors/cytokines	1. Describe the Structure of neuron									
		2. Explain the functions of neuron, neuroglia	K	KH	Y	Lecture	Written				1
		3. Describe Nerve growth factors & cytokines 4. Discuss classifications of nerve fibers & neuroglia	K	KH	Y	Lecture	Written				1
		5. Explain the Synthesis of neurotransmitters, 6. Discuss physiological basis of local anesthesia	K	KH	Y	Lecture	Written				1
PY 3.2	Describe the types, functions & properties of nerve fibers	1. Describe Properties of nerve fibers	K	KH	Y	Lecture	Written				1
PY 3.3	Degeneration & regeneration of peripheral nerves	1. Describe Wallerian degeneration 2. Explain about Regeneration 3. Discuss the grading of nerve injury	K	KH	Y	Lecture	Written		General Medicine		1
PY 3.4	Describe the structure of Neuromuscular junction	1. Describe the Structure of neuromuscular junction 2. Describe about transmission of impulse, end plate potential	K	KH	Y	Lecture	Written				1
PY 3.5	Discuss the action of neuromuscular blocking agents	1. Explain about Blocking agents 2. Mention the Drugs that enhance transmission	K	KH	Y	Small group teaching	Written		Anaesthesia & Pharmacology		1

PY 3.6	Describe the pathophysiology of myasthenia gravis	1. Explain Autoimmune disease. 2. Discuss the Features of myasthenia gravis	K	KH	Y	Small group teaching	Written				1
PY 3.7	Describe the different types of muscle fibers & their structure	1. Discuss the Classification of muscle fibers 2. Describe the Structure of skeletal, smooth & cardiac muscle	K	KH	Y	Lecture	Viva voce				1
PY 3.8	Describe action potential & its properties in different muscle types (Skeletal & smooth)	1. Describe Properties of skeletal muscle 2. Explain ionic basis of Action potential 3. Discuss action potential in different types of muscle	K	KH	Y	Lecture	Written				1
PY 3.9	Describe the molecular basis of muscle contraction in skeletal & smooth muscle	1. Describe Sarcomere, Sarcotubular system in smooth and skeletal muscle 2. Explain about theory of muscle contraction 3. Describe the Molecular mechanism of muscle contraction 4. Explain Excitation contraction coupling 5. Describe the Structure of contractile proteins	K	KH	Y	Lecture	Written				1

		6. Outline the differences in smooth and skeletal muscle contractions									
PY 3.10	Describe the mode of muscle contraction (Isometric & Isotonic)	1. Mention Isotonic contractions with examples 2. Mention Isometric contractions with examples	K	KH	Y	Lecture	Written				1
PY 3.11	Explain energy source & muscle metabolism	1. Describe the Source of energy 2. Explain about ATP, phosphor creatine creatinine system 3. Describe about Glycogen lactic acid system, aerobic system 4. Explain oxygen debt 5. Mention Nutrients used during muscle activity	K	KH	Y	Small group teaching	Written				1
PY 3.12	Explain the gradation of muscular activity	1. Explain about the Strength of muscle 0 to 5 level	K	KH	Y	Small group teaching	Written				1
PY 3.13	Describe muscular dystrophy, myopathies	1. Describe Duchenne muscular dystrophy 2. Mention about Auto immune conditions	K	KH	Y	Small group teaching	Written				1
PY 3.14	Perform ergography	1. Demonstrate the Practical procedure of ergography	K	SH	Y	DOAP	Practical				2

PY 3.15	Demonstrate effect of mild, moderate & severe exercise & record changes in cardio respiratory parameters	1. Describe and perform the recordings of Heart rate and pulse rate 2. Describe the steps of recording BP and perform 3. Describe and perform the recording of respiratory rate 4. Explain Respiratory changes on exercise	K	SH	Y	DOAP	Practical				2
PY 3.16	Demonstrate Harvard step test & describe the impact on induced physiologic parameters in a stimulated environment	1.Explain changes in respiratory and cardiovascular systems during exercise	K	SH	Y	DOAP	Practical				2
PY 3.17	Describe strength duration curve	1.Explain Rheobase, chronaxie, unit time with the help of chart	K	KH	Y	Small group teaching	Written				1
PY 3.18	Observe with computer assisted learning a) Amphibian nerve muscle experiments	1.Identify and describe different Nerve muscle charts like a)Simple muscle twitch	K	KH	Y	Small group teaching	Written				2

	b) Amphibian cardiac experments	b)Effective of two successive stimuli c)Demonstration of fatigue d)Demonstration of tetanus e)Effect of temperature un contracting muscle									
		2. Identify and discuss Amphibian cardiac charts	K	KH	Y	Small group teaching	Viva voce				2
PY 4.1	Describe the structure and functions of digestive system..	1.Explain the structure of digestive system	K	KH	Y	Self directed learning	Written/ viva voce				1
		2.List out the functions of digestive system.	K	KH	Y	Lecture	Written/ viva voce				2
		3 Explain different phases of deglutition	K	KH	Y	Small group discussion	Written/ viva voce				1
PY 4.2	Describe the composition, mechanism of secretion, functions and regulation of saliva, gastric, pancreatic,intestinal juices and bile secretion.	1. Explain the composition of saliva	K	KH	Y	Self directed learning	Written/ viva voce				1
		2. Explain the mechanism of secretion of saliva 3. Enumerate different functions of saliva 4. Explain the regulation of secretion of saliva	K	KH	Y	Lecture	Written/viva voce				2
		5. Explain the composition of gastric juice 6. Explain the mechanism of secretion of HCL	K	KH	Y	Lecture	Written/viva voce				1

		7. List out the functions of gastric juice									
		8. Explain the regulation of secretion of gastric juice	K	KH	Y	Lecture	Written/viva voce				1
		9.Explain the composition of pancreatic juice 10.List out the functions of pancreatic juice 11.Describe the regulation of secretion of pancreatic juice	K	KH	Y	Lecture	Written/viva voce				
		12.Explain the composition of intestinal juice 13.Enumerate the different functions of intestinal juice 14.Explain the regulation of secretion of intestinal juice	K	KH	Y	Lecture	Written/viva				1
		15.Explain the composition of bile 16.Enumerate the different functions of bile 17.Explain the regulation of secretion of bile	K	KH	Y	Lecture	Written/viva				1
PY 4.3	Describe GIT movements, regulation and	1.Explain different phases of Gastro intestinal motility	K	KH	Y	Small group discussion	Written/viva voce				1

	functions. Describe defecation reflex. Explain role of dietary fiber.	2.Discuss regulation of Gastro intestinal motility	K	KH	Y	Small group discussion	Written/viva voce				1
		3.Explain the pathway of defecation reflex	K	KH	Y	Lecture	Written /viva				1
		4.List out the different dietary fibers	K	K	Y	Lecture	Written /viva				
		5.Explain the mechanism of Dietary fibers in treatment of constipation	K	KH	Y	Small group discussion	Written/viva voce				1
PY 4.4	Describe the physiology of digestion & absorption of nutrients.	1.Explain the digestion of fats carbohydrate and proteins .	K	KH	Y	Lecture	Written/viva voce			Biochem	1
		2.Explain the absorption of fats carbohydrate and proteins .	K	KH	Y	Lecture	Written/viva voce			Biochem	1
PY 4.5	Describe the sources of GIT hormones, their regulation and functions	1.Enumurate the hormones involved in Gastro intestinal motility 2.List out the functions of gastro intestinal hormones	K	K	Y	Small group discussion	Written/viva voce				1
		3.Explain the regulation of gastro intestinal hormones secretion	K	KH	Y	Lecture	Written/viva voce				1
PY 4.6	Describe the gut-brain axis	1.Explain the structure of enteric nervous system 2.List out the functions of enteric nervous system	K	KH	Y	Small group discussion	Written/ viva voce				1
PY 4.7	Describe & discuss the structure and	1.Explain the physiological anatomy of liver	K	KH	Y	Lecture	Written/ viva voce				2

	functions of liver and gall bladder	2.Enumerate the functions of liver	K	K	Y	Small group discussion	Written/viva voce				1
		3. Explain the physiological anatomy of Gall bladder	K	KH	Y	Small group discussion	Written/viva voce				1
		4. .Enumerate the functions of Gall bladder	K	K	Y	Small group discussion	Written/viva voce		General medicine		1
PY 4.8	Describe and discuss gastric function tests, pancreatic exocrine function tests and liver function test	1.Discuss the different Gastric function tests	K	KH	Y	lecture	Written/viva voce				1
		2.Explain the different Pancreatic exocrine function tests	K	KH	Y	Small group discussion	Written/viva voce			Biochem	1
		3.Explain the different Liver function tests	K	KH	Y	lecture	Written/viva voce				1
PY 4.9	Discuss the physiological aspects of peptic ulcer, gastro-oesophageal reflux disease, vomiting, diarrhoea,constipation,adynamicileus,Hirschsprung's disease.	1.Explain the physiological aspects of peptic ulcer,	K	KH	Y	lecture	Written/viva voce				2
		2.List out the different Gastro-oesophageal reflux disease	K	K	Y	Small group teaching	Written/viva voce				1
		3.Discuss the physiology of vomiting,diarrhoe and constipation	K	KH	Y	lecture	Written/viva voce				2
		4.Discuss the pathophysiology of adynamicileus and Hirschsprung's disease	K	KH	Y	Small group teaching	Written/viva voce				1

PY 4.10	Demonstrate the correct clinical examination of abdomen in a normal volunteer or simulated environment	1.Clinicallyexamine the abdomen and interpret the findings to differentiate normal and abnormal features	S	SH	Y	DOAP session	Skill assessment / viva voce/ OSCE				4
PY 5.1	Describe the functional anatomy of heart including chambers, sounds and pacemaker tissue and conducting system	1.Explain the different cardiac chambers	K	KH	Y	Lecture	Written/ viva voce				1
		2.Explain the conducting system of the heart.	K	KH	Y	small group discussion	Written/ viva voce				1
PY 5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions.	1.Describe in detail the Properties of cardiac muscle	K	KH	Y	Self directed learning	Written/ viva voce				1
		2.Explain the morphology of cardiac muscle	K	KH	Y	small group discussion	Written/ viva voce				1
		3.Explain the electrical properties of cardiac muscle 4.Explain the mechanical properties of cardiac muscle 5.Explain the metabolic properties of cardiac muscle	K	KH	Y	Lecture	Written/ viva voce				1
PY 5.3	Discuss the events occurring during cardiac cycle.	1.Explain cardiac cycle and pressure and volume changes	K	KH	Y	Lecture	Written/ viva voce				2
		2.Discuss the different waves of Jugular venous	K	KH	Y	small group	Written/ viva voce				1

		pressure				discussion					
PY 5.4	Describe generation, conduction of cardiac impulse.	1.Discuss cardiac impulse generation	K	KH	Y	small group discussion	Written/ viva voce				1
PY 5.5	Describe the physiology of ECG, its applications and the cardiacaxis.	2.Explain the physiological basis of different waves of ECG	K	KH	Y	lecture	Written/viva voce				2
		3. List out the applications of ECG 4. Calculate the cardiac axis , and heart rate on a given ECG paper	K	KH	Y	lecture	Written/ viva voce				1
PY 5.6	Describe abnormal ECG, arrhythmias, heart block and myocardial infraction.	1.Identify arrhythmias, heart block/ myocardial infarction on a given ECG paper	K/s	KH	Y	lecture	Written/viva voce		Gen medicine	Anatomy	1
PY 5.7	Describe and discuss the hemodynamics of circulatory system	1.Explain the hemodynamics of circulatory system	K	KH	Y	lecture	Written/viva voce				2
PY 5.8	Describe and discuss local and systemic cardiovascular regulatory mechanism	1.Explain the local cardiovascular regulatory mechanism	K	KH	Y	Lecture	Written/viva voce				2
		2.Explain the systemic cardiovascular regulatory mechanism	K	KH	Y	Lecture	Written/viva voce				2
PY 5.9	Describe the factors affecting heart rate, regulation of cardiac output and blood pressure	1.Enumerate the factors affecting the heart rate	K	K	Y	Lecture	Written/ viva voce				2
		2.Define cardiac output and Explain the factors altering the cardiac output	K	KH	Y	Lecture	Written/ viva voce				1

		3.List out the methods of measurement of cardiac output	K	K	Y	Lecture	Written/ viva voce				1
		4.Explain the different factors affecting blood pressure	K	KH	Y	Lecture	Written/ viva voce				1
PY 5.10	Describe and discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation.	1.Enumerate different components of regional circulations	K	K	Y	Small group discussion	Written/viva voce				2
		2.Explain the physiology of each different regional circulations	K	KH	Y	Small group discussion	Written/ viva voce				2
PY 5.11	Describe the pathophysiology of shock, syncope and heart failure.	1.Classify types of shock	K	KH	Y	Small group discussion	Written/ viva voce		General medicine		1
		2.Explain the pathophysiology of shock and syncope 3.Describe the pathophysiology of heart failure	K	KH	Y	Smallgroup discussion	Written/ viva voce				1
PY 5.12	Record BP and pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	1.Record BP and pulse at rest and different postures and in different grades of exercise	S	SH	Y	DOAP sessions	Practical/OSPE/ viva voce	1			4

PY 5.13	Record and interpret normal ECG in a volunteer or simulated environment	1.Record an ECG on a volunteer	S	SH	Y	DOAP sessions	Practical/OSPE/viva voce				4
		2.Interpret a normal ECG	S	SH	Y	DOAP sessions					6
PY 5.14	Observe cardiovascular autonomic function tests in a volunteer or simulated environment.	1.Observe cardiovascular autonomic function tests in a volunteer	S	SH	N	DOAP SESSIONS	Skill assessment /viva voce				2
PY 5.15	Demonstrate the correct clinical examination of the CVS in a normal volunteer or simulated environment	1.Clinically examine the Cardiovascular system	S	SH	Y	DOAP sessions	Practical/OSPE/viva voce	1			6
		2. Differentiate abnormal Heart Sounds from normal heart sounds.	K	SH	Y	small group discussion	Written/ viva voce				1
PY 5.16	Record arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	1.Record arterial pulse tracing using finger plethysmography.	S	SH	N	DOAP session/computer assisted learning methods	Practical/ OSPE/viva voce				2
PY 6.1	Describe the functional anatomy of respiratory tract	1.Describe the functional anatomy of respiratory tract	K	KH	Y	Self directed learning	Written/viva voce				1
		2.Discuss the different layers of respiratory membrane	K	KH	Y	self directed learning	Written/viva voce				1
PY 6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung	1.Discuss the mechanics of normal respiration,	K	KH	Y	small group discussion	Written/viva voce				2
		2.Describe the various lung volumes and capacities	K	KH	Y	Small group	Written/viva voce				2

	volumes and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs					discussion					
		3. Define the terms alveolar surface tension, compliance and airway resistance 4. Discuss the factors affecting each	K	KH	Y	Lecture	Written/viva voce				2
		5. Define the V/P ratio, 6. Mention the factors affecting diffusion capacity of lungs	K	KH	Y	small group discussion	Written/viva voce				2
		7. Define Dead space 8. Mention the types and their clinical significance 9. Describe the measurement method for dead space	K	KH	Y	small group discussion	Written/viva voce				2
PY 6.3	Describe and discuss the transport of O2 and CO2	1. Describe the transport of oxygen 2. Discuss the significance of O2-Hb dissociation curve	K	KH	Y	lecture	Written/viva voce				2
		3. Describe the CO2 transport and Haldane effect and its significance	K	KH	Y	lecture	Written/viva voce				2
		4. Discuss the components of neural regulation of respiration	K	KH	Y	Lecture	Written/viva voce				2
		5. Explain the chemical regulation of respiration	K	KH	Y	lecture	Written/viva voce				2

PY 6.4	Describe and discuss the physiology of high altitude and deep sea diving.	1.Explain the Pathophysiology of high altitude sickness- acute and chronic	K	KH	Y	lecture	Written/ viva voce				2
		2.Explain the physiological changes in high altitude dwellers and in mountain climbers.	K	KH	Y	Small group teaching	Written/ viva voce				1
		3.Describe the physiology of Deep sea diving,	K	KH	Y	Lecture	Written/ viva voce				2
PY 6.5	Describe and discuss the principals of artificial respiration, oxygen therapy, acclimatization and decompression sickness.	1. Mention the Principles of artificial respiration, 2. Outline the indications and uses of oxygen therapy	K	KH	Y	Lecture	Written/ viva voce		Anaesthesia		1
		3.Define Acclimatization and decompression sickness 4.Explain the signs and symptoms of Acute & chronic mountain sickness 5.Mention the causes and symptoms of decompression sickness	K	KH	Y	small group discussion	Written/viva voce				2
PY 6.6	Describe and discuss the pathophysiology of dysponea, hypoxia, cyanosis asphyxia, drowning, periodic breathing.	1.Discuss the Pathophysiology of dysponea, 2.Define and Classify hypoxia	K	KH	Y	small group discussion	Written/viva voce				2
		3.Define the terms Cyanosis, asphyxia, drowning, &periodic breathing	K	KH	Y	small group discussion	Written/viva voce				2

		4.Describe the physiological basis of each									
		5.Mention the different types of Abnormal respirations	K	KH	Y	small group discussion	Written/viva voce				1
PY 6.7	Describe and discuss lung function tests and their clinical significance	1.Enumerate various lung function tests and their clinical significance	K	KH	Y	Small group discussion	Written/viva voce				2
PY 6.8	Demonstrate the correct technique to perform and interpret spirometry.	2.Perform and interpret spirometry	S	SH	Y	DOAP sessions	Skill assessment /viva voce		Respiratory medicine		2
PY 6.9	Demonstrate the correct clinical examination of respiratory system in a normal volunteer or simulated environment.	1. Clinically examine respiratory system 2. Identify normal and abnormal findings and interpret	S	SH	Y	DOAP sessions	Skill assessment /viva voce	1			6
		3.Identify Abnormal Breath Sounds	K	KH	Y	small group discussion	Written/viva voce				1
PY 6.10	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment.	1.Perform measurement of peak expiratory flow rate	S	SH	Y	DOAP sessions	Practical/OSPE/viva voce				2
PY 7.1	Describe structure and function of kidney.	1.Describe the structure and function of nephron	K	KH	Y	Self directed learning	Written/ viva voce				1

		2.Explain the non-excretory functions of kidney	K	KH	Y	Self directed learning	Written/ viva voce				1
		3. Describe the renal circulation 4. Discuss the steps to Measure renal blood flow and calculate	K	KH	Y	Small group discussions	Written/ viva voce				2
PY 7.2	Describe the structure and function of JG apparatus and renin-angiotensin system.	1. Explain the structure of JG apparatus 2. Describe in detail renin-angiotensin system..	K	KH	Y	Small group discussion	Written/ viva voce				3
PY 7.3	Describe the mechanism of urine formation involving processes of filtration, tubular reabsorption and secretion, concentration and diluting mechanisms.	1.Discuss in detail the mechanism of Counter-current multiplier and Counter-current exchange systems	K	KH	Y	lecture	Written/ viva voce				3
		2.Define GFR & factors regulating it,	K	KH	Y	lecture	Written/ viva voce				2
		3.Mention the process of tubular reabsorption and secretion.	K	KH	Y	Lecture	Written				2
PY 7.4	Describe and discuss the significance and implication of renal clearance.	1.Describe renal clearance mechanisms,	K	KH	Y	Small group discussion	Written/ viva voce				1
		2.Discuss the methods to measure GFR, and other clearance tests	K	KH	Y	Small group discussion	Written/ viva voce				1

PY 7.5	Describe the renal regulation of fluid and electrolytes and acid-base balance.	1.Discuss Acid-base balance and the buffers	K	KH	Y	lecture	Written/ viva voce				2
		2.Describe and define Acidosis and Alkalosis	K	KH	Y	Small group discussion	Written/ viva voce				1
PY 7.6	Describe the innervation of urinary bladder, physiology of micturation and its abnormalities.	1. Describe the nerve supply of bladder, 2. Explain the Micturation reflex, 3.Discuss cystometry and cystometrogram	K	KH	Y	Small group discussion	Written/ viva voce		Pharmacology		2
		4.Enumerate the anamolies of Bladder Dysfunction	K	KH	Y	Small group discussion	Written/ viva voce				1
		5.Explain the mechanism of action of diuretics	K	KH	Y	Lecture	Written/ viva voce				1
PY 7.7	Describe artificial kidney, dialysis and renal transplantation.	1.Explain the role of artificial kidney, and mechanism of action 2.Outline the indications of dialysis and uses 3.Discuss the indications and advantages and complications of renal transplantation..	K	KH	Y	Lecture	Written/ viva voce		General medicine		1
PY 7.8	Describe and discuss renal function tests.	1.Enumerate the various renal function tests 2.Discuss the advantages and disadvantages of various tests	K	KH	Y	Lecture	Written/ viva voce			biochem	1

PY 8.1	Describe the physiology of bone and calcium metabolism.	1.Explain Physiological anatomy of bone	K	KH	Y	Self directed learning	Written/ viva voce				1
		2.Discuss the hormones for Calcium metabolism, the secretion and regulation	K	KH		Lecture	Written/ viva voce				1
		3.Describe the role of Parathormone in calcium metabolism	K	KH		Lecture	Written/ viva voce				1
PY 8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid, parathyroid, adrenal, pancreas and hypothalamus.	1 Discuss the physiological anatomy of hypothalamus 2.Outline the hormones released from hypothalamus with their mechanism of action	K	KH	Y	Small group teaching	Written/ viva voce				1
		3. Discuss the physiological anatomy of Ant pituitary, 4. Outline the hormones secreted from anterior pituitary 5.Describe the synthesis, function and regulation of the Growth hormone	K	KH	Y	Lecture	Written/ viva voce				2
		6.Explain the pathophysiology , signs and symptoms of Gigantism & dwarfism	K	KH	Y	small group discussion	Written/viv a voce				1
		7.Enumerate the hormones released from Posterior pituitary 8.Outline the synthesis , regulation and actions of ADH	K	KH	Y	Lecture	Written/viv a voce				2

		9.Describe the Thyroid secretion, synthesis and functions,	K	KH	Y	Lecture	Written/viva voce				3
		10.Enumerate the signs and symptoms of hyper & hypo thyroidism	K	KH	Y	small group discussion	Written/viva voce		General surgery		2
		11.Describe the physiological anatomy of adrenal cortex and medulla. 12.Enumerate the hormones released from adrenal cortex and medulla , 13.Explain in detail the synthesis, regulation and mechanism of action of cortisol. And catecholamines	K	KH	Y	Lecture	Written/ viva voce				3
		14.Enumerate the signs and symptoms of Cushing's and addison's disease	K	KH	Y	Lecture	Written/ viva voce		General medicine		1
		15.Describe the physiological anatomy of Pancreas 16.Outline the endocrine hormones secreted 17.Discuss in detail the synthesis, regulation and functions of insulin and glucagon	K	KH	Y	Lecture	Written/ viva voce				1

		18.Discuss the pathophysiology, signs and symptoms of Diabetes mellitus	K	KH	Y	Lecture	Written/ viva voce		General medicine		1
PY 8.3	Describe the physiology of thymus and pineal gland	1.Describe the physiological anatomy of thymus and pineal gland	K	KH	Y	Self directed learning	Written/ viva voce				1
		2.Discuss the physiology of Circadian Rhythm	K	KH	Y	Small group teaching	Written/ viva voce				1
PY 8.4	Describe the function tests:.	1. Enumerate the various thyroid function test, 2. Interpret the tests	K	KH	Y	Small group discussions	Written/ viva voce			Biochem	2
		3.Describe Glucose tolerance test and interpret the results	K	KH	Y	Self directed learning	Written/ viva voce				1
PY 8.5	Describe the metabolism and endocrine consequences of obesity & metabolic syndrome, stress response. Outline the psychiatry component pertaining to metabolic syndrome.	1. Discuss the pathophysiology of of obesity 2. Describe the endocrine consequences of various metabolic syndromes	K	KH	Y	Lecture	Written/ viva voce				1
		3.Outline the Stress response in metabolic syndrome	K	KH	Y	Small group teaching	Written/ viva voce				1
		4.Discuss the psychiatric component pertaining to metabolic syndrome.	K	KH	Y	Small group discussion	Written/ viva voce				1
PY 8.6	Describe& differentiate the mechanism of action	1.Enumerate different types of hormones based on the composition and	K	KH	Y	Small group discussion	Written/ viva voce				1

	of steroid, protein and amine hormone.	structure 2.Discuss the Mechanism of action of steroid, protein and amine hormone.									
PY 9.1	Describe and discuss sex determinationsex differentiation and their abnormities and outline psychiatry and practical implication of sex determination.	1. Outline the role of. Human chromosomes, Human gametes, 2. Genetic sex determination, Formation of Barr body	K	KH	Y	Lecture,	Written			Human Anatomy	1
		3. Summarize Gonadal differentiation, Genital differentiation and Psychological differentiation	K	KH	Y	Lecture,	Written				1
		4.list Chromosomal abnormalities ,Hormonal abnormalities and their features	K	KH	Y	Small group teaching	Viva voce				
		5.Discuss the psychiatric and practical implication of sex determination	A	K H	Y	Small group teaching	Viva voce				1
PY9.2	Describe and discuss puberty: onset, progression, stages;	1.Summarize Components of puberty	K	KH	Y	Small group teaching					1

	early and delayed puberty and outline adolescent clinical and psychological association.	2. Outline Hormonal changes during puberty 3. Describe Control of onset of puberty 4. Discuss Disorders of puberty	K	KH	Y	Lecture	Written				1
PY 9.3	Describe male reproductive system: functions of testis and control of spermatogenesis& factors modifying it and outline its association with psychiatric illness	1. Describe the physiological anatomy of Male reproductive system	K	KH	Y	Self directed learning	Written				1
		2 .Outline the steps involved in spermatogenesis	K	KH	Y	lecture	Written				1
		3 .Discuss the general structure of testosterone, and describe its biosynthesis, transport, metabolism, and actions. 4.Describe the processes involved in regulation of testosterone secretion.	K	KH	Y	Small group teaching	Written				
		5.Enumerate the abnormal conditions like Cryptorchidism , Hypogonadism and Hypergonadism	K	K	N	Small group teaching-CBL	Viva Voce				
PY	Describe female reproductive	1 .Describe physiological anatomy of female reproductive system	K	KH	Y	Lecture	Written				1

9.4	system: (a) functions of ovary and its control; (b) menstrual cycle - hormonal, uterine and ovarian changes	2.Describe the physiologic changes that occur in the female reproductive organs during the menstrual cycle.	K	KH	Y	Lecture,	Written				1
		3.Describe the roles of the pituitary and the hypothalamus in the regulation of ovarian function, and the role of feedback loops in this process.	K	KH	Y	Small group discussion	Written				1
PY9.5	Describe and discuss the physiological effects of sex hormones	1.Discuss the general structures of 17 -estradiol and progesterone 2 .Describe their biosynthesis, transport, metabolism	K	KH	Y	Small group discussion	Viva Voce				1
		3. Enumerate all the physiological actions.	K / S	KH	Y	Small group discussion	Written				1
PY9.6	Enumerate the contraceptive methods for male and female. Discuss their advantages & disadvantag	1. Enumerate the contraceptive methods for male with advantages and disadvantages	K/A /C	KH	Y	Self directed learning	Written, viva voce				1
		2 .Enumerate the contraceptive methods for female with advantages and disadvantages	K/A /C	KH	Y	Lecture,	Written, viva voce				1

PY9.7	Describe and discuss the effects of removal of gonads on physiological functions	1 .Describe the causes of gonadectomy 2 .Outline the effects of removal of gonads	K	KH	Y	Small group discussion	Written				1
PY9.8	Describe and discuss the physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry-disorders associated with it.	1 .Describe the Fertilization and implantation and formation of placenta	K	KH	Y	Lecture	Written				1
		2 .Enumerate the hormones secreted from placenta and their functions	K	KH	Y	Small group discussion	Written				1
		3. Describe the hormonal changes that accompany pregnancy	K	KH	Y	Small group discussion	Written				1
		4.Describe Mechanics and Control of parturition	K	KH	Y	Lecture	Written				1
		5.Outline Phases of lactation and the processes involved in lactation 6.List the physiologic stimuli and the drugs that affect prolactin secretion	K /C	KH	Y	Small group discussion	Viva voce				1

		7. Outline the disorders associated with it. 8. Enumerate the Advantages of breastfeeding	K /C	KH	Y	Small group discussion	Viva voce				1
PY9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and discuss the results	1. Interpret a normal (a) sperm count, (b) sperm morphology (c) sperm motility, as per WHO guidelines 2. Discuss the results	K	KH	Y	Small group discussion	OSPE				1
PY 9.10	Discuss the Physiological basis of various pregnancy tests	1 .Outline all the tests for diagnosing and confirming pregnancy 2. Describe the physiological basis of the test	K	KH	Y	Small group discussion	Viva voce				1
PY 9.11	Discuss the hormonal changes and their effects during peri menopause and menopause	1. Define menopause 2. Explain the hormonal changes	K	KH	Y	Small group discussion	Viva voce				1
		3. Enumerate physiologic effects during peri menopause and menopause.	K	KH	Y	Small group discussion	Viva voce				1

PY 9.12	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	1. Outline abnormal Conditions that Cause Female infertility 2. list thetreatment modalities	K	KH	Y	lecture	Viva voce		Obstetrics & Gynaecology		1
PY 10.1	Describe and discuss the organization of nervous system	1. Describe the functional anatomy and physiological properties of the nerve	K	KH	Y	Self directed learning	Written				1
		2. Define and describe nerve potentials	K	KH	Y	Small group discussion	Written				1
		3.Describe the Physiological anatomy and functional organization of nervous system	K	KH	Y	Lecture	Written , viva voce			Human Anatomy	1
PY 10.2	Describe and discuss the functions and properties of synapse, reflex, receptor	1.Describe the main morphologic features of synapses.	K	KH	Y	Small group discussion	Written				1
		2-.Distinguish between chemical and electrical transmission at synapses.	K	KH	Y	Lecture	Written				1
		3.Define convergence and divergence in neural networks, and discuss their implications. 4.Describe fast and slow excitatory and inhibitory	K	KH	Y	Lecture	Written				1

		postsynaptic potentials,									
		5. Outline the ionic fluxes that underlie them, and explain how the potentials interact to generate action potentials	K	KH	Y	Small group discussion	Written				1
		6.Define and give examples of direct inhibition, indirect inhibition, presynaptic inhibition, and postsynaptic inhibition.	K	KH	Y	Small group discussion	Written				1
		7. Describe the components of a reflex arc. 8. Describe the muscle spindles and their role in the stretch reflex	K	KH	Y	Small group discussion	Written				1
		9.Describe the Golgi tendon organs and analyze their function as part of a feedback system that maintains muscle force	K	KH	Y	Small group discussion	Written				1
		10.Define reciprocal innervation, inverse stretch reflex, clonus, and lengthening reaction	K	KH	Y	Small group discussion	Written				1

		11. Describe the classification of sensory receptors. 12. Explain the types of sensory receptors found in the skin, and discuss their relation to touch, cold, warmth, and pain.	K	KH	Y	Lecture	Written				1
		13. Define generator potential. 14. Explain the essential elements of sensory coding	K	KH	Y	Small group discussion	Written				1
PY 10.3	Describe and discuss somatic sensations & sensory tracts	1. Name the types of peripheral nerve fibers and receptor types that mediate warmth, cold, and nociception. 2. Explain the somatotopic organization of ascending sensory pathways.	K	KH	Y	Lecture	Written Vivo voce				1
		3. Describe the pathway that mediates sensory input from touch, proprioceptive, and vibratory senses and	K	KH	Y	Small group discussion	OSCE				1
		4. Explain pathways mediating information from pain and thermo receptors. 5. Explain the differences between fast and slow	K	KH	Y	Small group discussion	Written Vivo voce				1

		pain and acute and chronic pain									
		6 .Explain hyperalgesia and allodynia. 7.Define and explain referred pain	K	KH	Y	Small group discussion	Written Vivo voce				1
PY 10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium & vestibular apparatus	1.Describe motor tracts – descending projections	K	KH	Y	Lecture	Written Vivo voce				1
		2. Describe how skilled movements are planned and carried out. 3. Name the posture-regulating parts of the central nervous system and discuss the role of each	K	KH	Y	Lecture	Written Vivo voce				1
		4 . Define decerebrate and decorticate rigidity, and comment on the cause and physiologic significance of each	K	KH	Y	Lecture	Written Vivo voce				1
		5.Describe the components and functions of the inner ear	K	KH	Y	Self directed learning	Vivo voce				1
		6.Explain how the receptors in the semicircular canals detect rotational acceleration and how the receptors in the saccule and utricle detect linear acceleration	K	KH	Y	Lecture	Written Vivo voce				1
		7.List the major sensory inputs that provide the information which is synthesized in the brain into the sense of position	K	KH	Y	Lecture	Written Vivo voce				1

		in space									
PY 10.5	Describe and discuss structure and functions of reticular activating system, autonomic nervous system (ANS)	1. Describe the location of the cell bodies and axonal trajectories of preganglionic sympathetic and parasympathetic neurons. 2. Describe the location and trajectories of postganglionic sympathetic and para-sympathetic neurons	K	KH	Y	Lecture	Written Vivo voce			Human Anatomy	1
		3-.Name the neurotransmitters that are released by preganglionic autonomic neurons, postganglionic sympathetic neurons, postganglionic parasympathetic neurons, and adrenal medullary cells	K	KH	Y	Small group discussion	Written Vivo voce				1
		4. Outline the functions of the autonomic nervous system	K	KH	Y	Self directed learning	Vivo voce				1
		5.List the ways that drugs act to increase or decrease the activity of the components of the autonomic nervous system	K	KH	Y	Small group discussion	Written Vivo voce				1
		6. Describe the location of neurons that provide input to sympathetic preganglionic neurons	K	KH	Y	Small group discussion	Written Vivo voce				1
PY 10.6	Describe and discuss Spinal cord, its	1.Define spinal shock	K	KH	Y	Lecture	Written				1

	functions, lesion & sensory disturbances	2.Describe the initial and long-term changes in spinal reflexes that follow transection of the spinal cord.									
		3. Outline the features of spinal injury	K	KH	Y	Small group discussion	Written				1
PY 10.7	Describe and discuss functions of cerebral cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system and their abnormalities	1.Describe the physiological anatomy of basal ganglia	K	KH	Y	Self directed learning	Written				1
		2.List the pathways that interconnect them, along with the neurotransmitters in each pathway.	K	KH	Y	Small group discussion	Written				1
		3.Mention Functions of basal ganglia andDisorders of basal ganglia	K	KH	Y	Small group discussion	Written				1
		4.Describe and explain the symptoms of Parkinson disease and Huntington disease	K	KH	Y	Small group teaching	Written				1
		5.Describe Physiological anatomy of thalamus- and Classification of thalamic nuclei	K	KH	Y	Small group discussion	Written				1
		6.Explain Connections of thalamus	K	KH	Y	Small group discussion	Written				1
		7.Mention Functions of thalamus and Applied aspects	K	KH	Y	Small group discussion	Written				1

		8.Describe Physiological anatomy of HYPOTHALAMUS ,External features, Subdivisions and nuclei of hypothalamus	K	KH	Y	Lecture	Written			Human anatomy	1
		9.Discuss Connections of hypothalamus	K	KH	Y	Lecture	Written				1
		10.Explain Functions of hypothalamus	K/s	KH	Y	Small group discussion	Viva voce				1
		11.Describe Cerebellum - Physiological anatomy ,External features, Subdivisions and nuclei of hypothalamus	K	KH	Y	Self directed learning	Written				1
		12.List the pathways to and from the cerebellum and the connections of each within the cerebellum.	K	KH	Y	Small group discussion	Viva voce				1
		13.Discuss the functions of the cerebellum 14 .Discuss the neurologic abnormalities produced by diseases of this part of the brain	K	KH	Y	Small group discussion	Written				1
		15.Explain Physiological anatomy of cortex, different lobes and their functions	K	KH	Y	Small group discussion	Written				1

		16 .Discuss components of limbic system, functions and applied aspects	K	KH	Y	Small group teaching	Written				1
PY 10.8	Describe and discuss behavioural and EEG characteristics during sleep and mechanism responsible for its production	1.Summarize the behavioral and EEG characteristics of each of the stages of non rapid eye movement (NREM) and rapid eye movement (REM) sleep and the mechanisms responsible for their production	K	KH	Y	Lecture	Written				1
		2. Describe the pattern of normal nighttime sleep in adults and the variations in this pattern from birth to old age. 3. Discuss the circadian rhythm and the role of the suprachiasmatic nuclei (SCN) in its regulation	K	KH	Y	Small group discussion	Viva voce				1
		4.Describe the diurnal regulation of synthesis of melatonin from serotonin in the pineal gland and its secretion into the bloodstream	K	KH	Y	Small group discussion	Viva voce				1
PY 10.9	Describe and discuss the physiological basis of memory, learning and speech	1. Describe the various types of long-term memory.	K	KH	Y	Lecture	Written				1
		2. Define synaptic plasticity, long-term potentiation (LTP), long-									

		term depression (LTD), habituation, and sensitization, and their roles in learning and memory									
		3.List the parts of the brain that appear to be involved in memory in mammals and summarize the proposed role of each in memory processing and storage	K	KH	Y	Small group discussion	Viva voce				1
		4. Describe the abnormalities of brain structure and function found in Alzheimer disease	K	KH	Y	Small group discussion	Viva voce				1
		5. Define the terms categorical hemisphere and representational hemisphere and summarize the difference between these hemispheres.	K	KH	Y	Lecture	Written				1
		6. Summarize the differences between fluent and non fluent aphasia, 7.Explain each type on the basis of its pathophysiology.	K	KH	Y	Small group discussion	OSCE				1

PY 10.10	Describe and discuss chemical transmission in the nervous system. (Outline the psychiatry element).	1. List neurotransmitters and the principal sites in the nervous system at which they are released.	K	KH	Y	Lecture	Written				1
		2. Describe the receptors for catecholamines, acetylcholine, 5-HT, amino acids, and opioids									
		3. Summarize the steps involved in the biosynthesis, release, action, and removal from the synaptic cleft of the various synaptic transmitters.	K	KH	Y	Small group discussion	Written				1
		4.Define opioid peptide, list the principal opioid peptides in the body, and name the precursor molecules from which they originate.									
		5.Outline the physiological basis of schizophrenia	K	KH	Y	Lecture	Written		Psychiatry		1
PY 10.11	Demonstrate the correct clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer or	1.Outline the various cranial nerves, their functions,	K	KH	Y	Self directed learning	Written				1
		2.Examine and test for functions of cranial nerves– I, III, IV, VI, VII, IX, X, XI, XII	S/C	P	Y	DOAP sessions	Skill assessment and OSCE	1			8
		3.Elicit various superficial and deep reflexes and	S/C	P	Y	DOAP	OSCE	1			2

	simulated environment	indicate their clinical significance.									
		4.Clinically examine the motor functions	S/C	P	Y	DOAP	Long case	1			6
		5.Clinically examine the sensory functions.	S/C	P	Y	DOAP	Long case	1			6
		6. Enumerate the differences between upper and lower motor neuron lesions	K	KH	Y	Lecture	Viva voce				1
		7.Perform Tests for various higher functions like memory and speech	S/C	P	Y	DOAP	OSCE	1			2
PY 10.12	Identify normal EEG forms	1. Describe the primary types of rhythms that make up the electroencephalogram (EEG). 2. Interpret the results. 3. List the main clinical uses of the EEG	S	S	Y	Small group teaching	OSPE/Viva voce				2
PY 10.13	Describe and discuss perception of smell and taste sensation	1. Describe the basic features of the neural elements in the olfactory epithelium and olfactory bulb. 2. Describe signal transduction in odorant	K	KH	Y	Lecture	Written				1

		receptors.									
		3.Describe the location and cellular composition of taste buds.	K	KH	Y	Self directed learning	Viva voce				1
		4.Mention the five major taste receptors and signal transduction mechanisms in these receptors	K	KH	Y	Lecture	Written				1
PY 10.14	Describe and discuss patho-physiology of altered smell and taste sensation	1.Outline the pathway by which impulses generated in the olfactory epithelium reach the olfactory cortex.	K	KH	Y	Small group discussion	Written				1
		2.Outline the pathways by which impulses generated in taste receptors reach the insular cortex.	K	KH	Y	Small group discussion	Written				1
PY 10.15	Describe and discuss functional anatomy of ear and auditory pathways & physiology of hearing	1.Describe the components and functions of the external, and middle, ear.	K	KH	Y	Self directed learning	Viva voce				1
		2.Describe the way by which impulses are generated in hair cells in the cochlea	K	KH	Y	Small group teaching	Written				1
		3. Discuss auditory pathways 4. Discuss the function of the auditory cortex	K	KH	Y	Small group teaching	Written				1

		5.Explain how pitch, loudness, and timbre are coded in the auditory pathways. and theories of hearing	K	KH	Y	Small group teaching	Viva voce				1
PY 10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests	1.Describe pathophysiology of deafness	K/S	KH	Y	Lecture	Written		ENT		2
		2.Outline various tests of hearing	K/S	SH/P	Y	Small group teaching	Viva voce				1
PY 10.17	Describe and discuss functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, refractive errors, colour blindness, physiology of pupil and light reflex	1.Describe the various parts of the eye and list the functions of each	K	KH	Y	Self directed learning	Written				1
		2.Explain the neural pathways that transmit visual information from the rods and cones to the visual cortex	K	KH	Y	Small group discussion	Written				1
		3.Explain how light rays are brought to a focus on the retina and the role of accommodation in this process.	K	KH	Y	Small group discussion	Viva voce				1
		4.Define hyperopia, myopia, astigmatism, presbyopia, and strabismus	K	KH	Y	Small group discussion	OSCE				1
		5.Describe the electrical responses produced by rods and cones, and explain	K	KH	Y	Lecture	Written				1

		6..Describe the electrical responses and function of bipolar, horizontal, amacrine, and ganglion cells.									
		7.Describe the responses of cells in the visual cortex and the functional organization of the dorsal and ventral pathways to the parietal cortex	K	KH	Y	Lecture	Written				1
		8.Define and explain dark adaptation and visual acuity.	K	KH	Y	Lecture	Written				1
		9. Describe the receptors of color vision. 10. Explain the mechanism of color vision. 11.Describe the neural pathways involved in color vision	K	KH	Y	Small group teaching	OSCE				1
PY 10.18	Describe and discuss the physiological basis of lesion in visual pathway	1.Describe the physiological basis of lesions 2.Discuss Effect of lesions in the optic pathways	K	KH	Y	Lecture	Written		Ophthalmology		1
PY 10.19	Describe and discuss auditory & visual evoked potentials	1. Define auditory & visual evoked potentials 2. Discuss the physiology of	K	KH	Y	lecture	Written				1

		generation of potentials									
PY 10.20	Demonstrate (i) Testing of visual acuity, colour and field of vision and ii) hearing iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment	1. Define visual acuity. 2. Explain the importance of determining distant and near vision.	K	KH	Y	lecture	Written				1
		3. Mention in detail the errors of refraction and how they are corrected. 4. Describe steps to test distant and near vision	K /S/C	KH /P	Y	DOAP	Skill assessment OSPE	1			4
		5-Perform Ishihara test on a subject. 6. Name some other tests of color vision 7. Explain the practical importance of color vision	K /S/C	KH /P	Y	DOAP	Skill assessment OSPE				2
		8. Define field of vision and physiological blind spot.	K	KH	Y	lecture	Written				1
		9. Determine the field of vision in a subject and describe its extent in various meridians.	K	KH	Y	DOAP	Skill assessment OSPE	1			4
		10. Perform hearing tests	K /S/C	SH /P	Y	DOAP	Skill assessment OSPE	1			4
		11. Assess the smell sensation on the patient	K /S/C	SH /P	Y	DOAP	Skill assessment OSPE	1			2

		12.Assess the taste sensation on the patient	K /S/C	SH /P	Y	DOAP	Skill assessment OSPE	1			2
PY 11.1	Describe and discuss mechanism of temperature regulation	1. List the mechanisms by which heat is produced in and lost from the body 2. Interpret the differences in temperature in the hypothalamus, rectum, oral cavity, and skin	K	KH	Y	lecture	Written				1
		3.List the temperature regulating mechanisms	K	KH	Y	Small group discussion	Viva voce				1
PY 11.2	Describe and discuss adaptation to altered temperature (heat and cold)	1.Describe the way in which regulating mechanisms are integrated under hypothalamic control to maintain normal body temperature	K	KH	Y	Small group discussion	Written / Viva voce				1
PY 11.3	Describe and discuss mechanism of fever, cold injuries and heat stroke	1 .Discuss the pathophysiology offever	K	KH	Y	lecture	Written				1
		2.Describe the physiological mechanisms involved in cold injuries 3 .Discuss the pathophysiology of heat stroke and the symptoms associated	K	KH	Y	Small group discussion	Viva voce				1
PY 11.4	Describe and discuss cardio-respiratory and metabolic adjustments during	1 .DefineExercise 2 .Discuss types and grading	K	KH	Y	lecture	Written				1

	exercise; physical training effects	4.Describe responses to exercise 5.Explain Oxygen consumption during exercise , Oxygen deficit and O_2 debt	K	KH	Y	Small group discussion	Viva voce				1
		6 .Enumerate Cardiovascular responses to exercise	K	KH	Y	lecture	Written				1
		7-.Enumerate Respiratory responses to exercise	K	KH	Y	lecture	Written				1
PY 11.5	Describe and discuss physiological consequences of sedentary lifestyle	1- Discuss physiological consequences of sedentary life 2.Enumerate the complications associated with obesity	K	KH	Y	Small group discussion	Viva voce				1
PY 11.6	Describe physiology of Infancy	1.Describe Systemic physiology of fetus, Newborn and childhood	K	KH	N	Lecture	Viva voce				1
PY 11.7	Describe and discuss physiology of aging; free radicals and antioxidants	1. Define ageing 2 .Describe Age-related changes in different organ systems	K	KH	N	lecture	Written				1
		3.Enumerate Theories of ageing 4 .Discuss the process of ageing	K	KH	N	Small group discussion	Viva voce				1

PY 11.8	Discuss & compare cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)	1. Discuss Effects of training on cardiovascular system , on respiratory system,on skeletal muscles,psychological effects ,metabolic effects	K	KH	Y	lecture	Written				1
		2.Compare the changes under different environmental conditions	K	KH	Y	Small group discussion	Viva voce				1
PY 11.9	Interpret growth charts	1.Explain physiology of Growth 2.Discuss Factors affecting growth and various Growth factors	K	KH	N	Lecture	OSPE/ Viva voce		Pediatrics		1
PY 11.10	Interpret anthropometric assessment of infants	1.Analyse anthropometric assessment of infants 2 .Discuss the physiological significance	K	KH	N	Small group discussion	OSPE/ Viva voce				1
PY 11.11	Discuss the concept, criteria for diagnosis of Brain death and its implications	1.Define brain death 2 .Outline the criteria for diagnosis 3.Describe the implications of brain death	K	KH	Y	Small group discussion	Viva voce				1
PY 11.12	Discuss the physiological effects of meditation	1.Enumerate different forms of meditation	K	KH	N	Self directed learning	Viva voce				1

		2 .Outline the physiological effects of meditation	K	KH	N	Small group discussion	Viva voce				1
PY 11.13	Obtain history and perform general examination in the volunteer / simulated environment	1.Elicit a detailed history 2 .Perfom a systematic general examination	S	SH	Y	DOAP sessions	Skill assessment /Viva voce				4
PY 11.14	Demonstrate Basic Life Support in a simulated environment	1.Describe Aim of CPR 2 .Outline The ABC of CPR	K /S/C	KH	Y	Lecture	Written		General Medicine, Anaesthesiology		1
		3.Enumerate causes of cardiopulmonary arrest 4.Outline Signs and symptoms of cardiopulmonary arrest	K /S/C	KH	Y	Lecture	Written				1
		5. Describe General plan for cardiopulmonary Resuscitation	K /S	KH	Y	Small group teaching	Viva voce				1
		6.Perform the maneuver in a simulator model	S	SH	Y	DOAP	OSCE				6

PHYSIOLOGY INTEGRATIONS

HORIZONTAL INTEGRATION PHYSIOLOGY TO ANATOMY

Number	Competency The student should be able to	SLO	Domain KƒSƒAƒC	Level KƒKHƒSƒSH ƒP	Core (YƒN)	Teaching – Learning methods	Assessment methods	Horizontal integration
AN22.3 AN22.4 AN22.7		1. Describe the origin , course , branches and applied anatomy of the Coronary arteries 2. Describe the anatomical basis of Ischaemic heart disease 3. List or enumerate the parts of the conducting system of the heart and describe their location and blood supply	KƒS	KH ƒSH	Y	1. Lecture 2. Small group discussion 3. DOAP	1.Written exam 2.Practical exam 3.Viva	PY5.6
AN75.1 AN75.5		1. Describe the principles of Genetic counselling 2. Describe the structural and numerical chromosomal aberrations 3. Identify and differentiate the sex of an individual by seeing a Karyotype chart	KƒS	KHƒSH	N	1. Lecture 2. Small group discussion 3. DOAP	1. Written exam 2. Practical viva	PY9.1

AN62.2 AN62.4 AN62.5 AN60.1 AN60.3		1. Identify and locate the functional areas of the Cerebral cortex 2. List or enumerate the parts of Basal ganglia and their connections 3. Describe in detail the Thalamus , its nuclei and their connections 4. Describe the boundaries , relations , nuclei and connections of the Hypothalamus 5. Describe and demonstrate the external and internal features of the Cerebellum and expain the anatomical basis of Cerebellar dysfunction 6. Enumerate parts and major connections of the Limbic system	KƒS	KHƒSH	Y	1. Lecture 2. Small group discussion	1.Written exam 2.Practical exam 3.Viva	PY10.7
AN7.1		1. Describe the formation , location and connections of the Reticular system 2. Describe the various components of the Autonomic nervous system	K	KH	Y	1. Lecture 2. Small group discussion	1.Written exam 2. Viva	PY10.5
AN7.1		1. Describe the components of Central , Peripheral and Autonomic nervous system	K	KH	Y	1. Lecture 2. Small group discussion	1.Written exam 2. Viva	PY10.1

HORIZONTAL INTEGRATION – PHYSIOLOGY TO BIOCHEMISTRY

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration
1.1	Describe the molecular and functional organization of a cell and its subcellular components	1. Describethe different parts of the cell	K	KH	Y	Small group teaching	W			Horizontal
		2.Mention the composition of intracellular fluid								
		3.Mention the functions of cell membrane								
		4.Mention the functions of different organelles								

Physiology topics integrated with Pathology

Number	COMPETENCY	Domain K/S/A/C	Level K/KH/SH/P	Core (Y/N)	Teaching-Learning Methods	Assessment Methods
PY 2.5	Describe different types of Anemias and Jaundice	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
Objectives	**PY 2.5.1** At the end of the session, phase I student must be able to define anemia correctly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.5.2 At the end of the session, phase I student must be able to know the different types and etiological factors of anemia significantly	k	KH	y	Lecture, Small group discussion	Written/Viva voce
	PY 2.5.3 At the end of the session, phase I student must be able to know the routine diagnostic tests for anemia	K & S	KH & SH	Y	DOAP	skill assessment
	PY 2.5.4 At the end of the session, phase I student must be able to define jaundice correctly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.5.5 At the end of the session, phase I student must be able to know the different types and etiopathogenesis of jaundice correctly	K	KH	N	Lecture, Small group discussion	Written/Viva voce
PY2.8	Describe physiological basis of hemostasis and anticoagulants, Descibe bleeding and clotting disorder (Hemophilia & purpura)	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.1 At the end of the session, phase I student must be able to define hemostasis correctly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce

Objectives	**PY 2.8.2** At the end of the session, phase I student must be able to understand the mechanism of hemostasis perfectly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.3 At the end of the session, phase I student must be able to know what is an anticoagulant correctly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.4 At the end of the session, phase I student must be able to know different types of anticoagulants correctly	K	KH	Y	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.5 At the end of the session, phase I student must be able to know different types of hemophilia correctly	K	KH	N	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.6 At the end of the session, phase I student must be able to know what is purpura correctly	K	KH	N	Lecture, Small group discussion	Written/Viva voce
	PY 2.8.7 At the end of the session, phase I student must be able to know the routine diagnostic tests for bleeding & clotting disorders accurately	K & S	KH & SH	Y	DOAP	skill assessment

VERTICAL INTEGRATION PHYSIOLOGY TO PHRMACOLOGY

No.	OBJECTIVES FOR THE RESPECTIVE COMPETENCY (At the end of the session the student should be able to)	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	Vertical Integration	Horizontal Integration	Hours
3.5	Classify neuro muscular blocking drugs	K	KH	Y	Lecture	Written*f*Viva				
7.6	A) Classify Diuretics	K	KH	Y	Lecture	Written*f*Viva				
	B) Classify Antidiuretics	K	KH	Y	Lecture	Written*f*Viva				
	C) Enumerate Drugs used in hyperactive bladder	K	KH	Y	Lecture	Written*f*Viva				

VERTICAL INTEGRATION – PHYSIOLOGY TO OTORHINOLARYNGOLOGY

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration
10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests	1.Enumerate the causes for the deafness	K	KH	Y	lecture	writing			
		2.Perform the hearing tests with tunning fork.	S	SH	Y	DOAP	Skill assessment ƒOSPE			

VERTICAL INTEGRATION – PHYSIOLOGY TO OPTHALMOLOGY

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration
10.18	Describe and discuss the physiological basis of lesion in visual pathway.	1. Describe the visual pathway 2. Enumerate the normal visual fields 3. Explain the abnormal visual pathway	K	KH	Y	lecture	written		Vertical	

VERTICAL INTEGRATION PHYSIOLOGY TO GENERAL MEDICINE									
No.	Objectives for the respectiveCompetency	Domain	KfKHfSHfP	CORE	TfL Method	Assessment Method	No req to certify P	Vertical Integration	Horizontal Integration
Describe the degeneration and regeneration in peripheral nerves	1.Enumerate the causes of Peripheral neuropathy 2.Mention Signs & Symptoms of Peripheral Neuropathy 3.Write a note on diabetic neuropathy 4.What are the investigations to diagnose peripheral neuropathy 5.A note on management of peripheral neuropathy	K	KH	Y	Lecture	Written			
Describe & discuss the structure and functions of liver and gall bladder	1.Causes of liver diseases 2.Discuss clinical features of liver diseases 3.Causes & features of different types of jaundice 4.A note on investigations &	K	KH	Y	Lecture	Written			

	treatment of liver diseases 5.What are the clinical features of cholecystitis								
Discuss the physiology aspects of: peptic ulcer, gastro- oesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	1.What are the causes of Peptic Ulcer & GERD 2. Clinical features of peptic Ulcer & GERD 3.What are the causes of Vomiting and Constipation 4.A note on causes and clinical features of diarrhea 5.Etiology & Clinical features of adynamic Ileus &Hirschsprung's disease	K	KH	Y	Small group Teaching	Viva – Voce			
Describe abnormal ECG, arrythmias, heart block and myocardial Infarction	1.What are the causes of ST elevation and depression 2.What are the causes of prolonged & short PR 3.What are the types of Heart block, its ECG Changes	K	KH	Y	Lecture	Written			

	4.A note on ECG Changes and types of Tachyarrythmias 5.ECG Changes in Myocardial infarction								
Describe the patho-physiology of shock, syncope and heart failure	1. List the causes and describe the clinical features of shock 2. A note on etiology & clinical features of syncope 3. What are the Causes of clinical features of heart failure 4.Investigations to diagnose shock, syncope and heart failure 5.A note on treatment of shock, syncope and heart failure	K	KH	Y	Lecture	Written			
Describe artificial kidney, dialysis and renal transplantation	1. Enumerate the causes and types of renal failure 2. A note on clinical features of renal failure 3. What are the indications of dialysis 4. What are the	K	KH	Y	Lecture	Written			

	types of dialysis 5.A note on complications of renal transplantation								
Describe The Synthesis,Secretion,Transport,Physiological Actions,Regulation And Affect Of Altered (Hypo Anf Hyper) Secretion Of Pituitary Gland,Thyroid,Parathyroid,Adrenal,Pancreas And Hypothalamus	1.What is the Etiology & Clinical feature of Hypo & Hyperthyroidism 2.What are the causes & Clinical feature of Hypopituitarism 3.A note on Etiology & Clinical feature ofPituitary Adenoma 4.Discuss the Etiology & Clinical feature of Cushings Syndrome & Addison's Disease 5.A note on Etiology & Clinical feature of Exocrine & Endocrine Pancreatic Deficiency	K	KH	Y	Small group Teaching	Written ƒ Viva – Voce			
Demonsrate Basic Life Support In A Simulated Environment	1.What is the Indication of BLS 2.What is CPR 3.What is defibrillation and it's indication 4.What are the Indications and dose of Vasopressors ,Atropine and Adrenaline 5.Interpretation of ECG in Cardiac Arrest.	S	SH	Y	Small group Teaching	Written ƒ Viva – Voce			

Vertical Integration Physiology to Surgery

Number	Competency The student should be able to	Specific learning objectives (SLO)	Domain K/S/A/C	Level K/KH/S/SH/P	CORE (Y/N)	Teaching learning method	Assessment method	Vertical integration	Horizontal integration
8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid, parathyroid, adrenal, pancreas and hypothalamus.	1. Describe clinical features of hypo function of thyroid gland 2.Describe clinical features of hyper function of thyroid gland 3.Explain the indications for Surgical treatment	k	KH	Y	1. Lecture 2. Small group discussion	1. Written exam 2. Practical exam with viva 3. OSCE	Physiology	

VERTICAL INTEGRATION PHYSIOLOGY TO OBSTETRICS & GYNAECOLOGY

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration
9.2	Discuss the common causes of infertility in a couple and role of IVF in managing case of infertility	1. Define infertility 2. Enumerate the causes of infertility in female and male patients 3. Define IVF 4. Describe the various procedures involved in IVF	K	KH	Y	Lecture	Written		Physiology	

VERTICAL INTEGRATION – PHYSIOLOGY TO PAEDIATRICS

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration
PY 11.9	Interpret growth charts	1- Define Growth curves▫	K	KH	N	Lecture	OSCE*f*Viva Voce		vertical	
		2-Enumerate the uses of growth charts								
		3 – Assess the growth chart								

VERTICAL INTEGRATION PHYSIOLOGY TO ANAESTHESIOLOGY									
NUMBER	**COMPETENCY** *The student should be able to*	**Specific Learning Objectives**	**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**	**INTEGRATION V/H**
3.5	Action of NM blocking drugs	By the end of the session phase−i student should be able to i.sites at which NMBS act ii.clinical use of NMBS iii.effects of NMBS iii.dosage of NMBS	K	KH	Y	Lecture	Written test and viva		

6.5	Artificial respiration	By the end of the session phase−i student should be able to 1.Identify the need for artifical respiration ii. justify the need for artifical respiration iii. define the procedure for providing artificial respiration iv.enumerate the uses of artificial respiration iv. list the various modalities for providing artificial respiration v.to define the physiological changes associated with artifical respiration vi.criteria for sedation for artifical respiration	K	KH	Y	Lecture simulation demonstration	Writ ten test and viva		

11.14	Demonstration of basic life support(BLS) in a simulated environment	By the end of the session phase−i student should be able to: i.recognise cardiac arrest ii.identify the person in need of basic life support iii. justify the need of basic life support iv. providebls with high quality cardio pulmonary resuscitation (cpr) v. analyse and interpret the condition of the person while providing the basic life support vi.enumerate the steps to be followed to provide basic life support	KƒS	KH	Y	Lecture simulation demonstration training session with workshop	Writ ten test and viva	P	

VERTICAL INTEGRATION – PHYSIOLOGY TO PULMONOARY MEDICINE

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration	Hours
6.8	Demonstrate the correct technique to perform and interpret spirometry	1.Know how to perform correctly	Kƒ S	KH	Y	DOAP	Skill assessment	1	Vertical		1
		2.Indentify obstructive airway disease									
		3. Indentify restrictive airway disease									
		4. Indentify mixed airway disease									

VERTICAL INTEGRATION PHYSIOLOGY TO PSYCHIATRY

No.	COMPETENCY The student should be able to:	Specific learning objectives The student should be able to:	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	Vertical Integration	Horizontal Integration	Hours
10.10	Describe and discuss chemical transmission in the nervous system.(outline the psychiatry element)	1.Describe about chemical transmission	K	KH	Y	Lecture	Written		Vertical		1
		2.Mention the list of Neurotransmitters involved in chemical transmission									
		3.Explain the role of chemical transmission in psychiatric disorders									
		4.Diagnosis of Schizophrenia and role of neurotransmitters in its etiology									
		5.Diagnosis of mood disorder and role of neurotransmitters in its etiology									