Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune 18

DEPARTMENT OF PHYSIOLOGY

Lesson plan schedule for **Lectures** I/II MBBS Regular batch (2017 – 2018)

Academics--> A) Revised lesson plan/ time table

Sr. No.	Date	Topic	Learning objectives	Name of teaching
1	02/08/17	Orientation to lecture programme		Dr. NG Borade
2	02/08/17	Orientation to practical labs Clinical lab Haematology lab		Dr. AN Patil Dr. Ramya J.
3	05/08/17	Orientation to Exam patterns Internal Assessment		Dr. NG Borade
4	05/08/17	Counseling of students		Dr. ST Methre Dr. SR Salvi
5	07/09/17	Cell & cell organelles Organization of cell	1) Component of cell- Cell membrane, cytoplasm, nucleus 2) Cell membrane:- structure & functions Cell organelles 1) Different cell organelles & their functions:- a) Endoplasmic reticulum:- i) Granular – Protein synthesis ii) Agranular or smooth – Lipid synthesis, detoxification. b) Ribosome :– Protein synthesis c) Mitochondria :- Powerhouse of the cell, synthesis of ATP d) Golgi complex :- Concentration &strorage of proteins e) Lysosomes :- Digestive function: Contains acid hydrolases enzymes. digestion of old cell organelles & bacteria Peroxisomes :- Contain acid oxidase enzymes. f) Nucleus :- Chromatin Network, Chromosomes , Gene (DNA) control center of cell controls chemical reactions & reproduction of cell	Dr. AN Patil
6	09/09/17	Homeostasis	1) Definition - Constancy of internal environment , 2) Importance , 3) Various regulatory mechanisms: Feedback control a) – ve mechanism Response is negative to stimulus, examples, feedback gain b) +ve feedback mechanism(Vicious cycle) --	Dr. SS Jadhav

			Response is positive to stimulus Examples:- Advantages 1) Parturition:- 2)Blood coagulation Disadvantages –Severe blood loss a) Feed forward mechanism	
7	12/09/17	Transport across the cell membrane-I	1) Body Fluid Compartments 2) Composition of ECF and ICF 3) Classification of Transport Mechanisms **I)Passive Transport mechanisms** A) Diffusion - Definition Types a) **Simple Diffusion** - definition Examples of each & characteristics of simple diffusion through lipid bilayer & protein channels b) **Facilitated Diffusion**-definition & its characteristics& example. Factors affecting rate of diffusion- c) Filtration d) Dialysis	Dr. MS Karandikar
8	12/09/17	Composition & functions of blood	1) Introduction 2) Properties of blood- color, volume, sp. gravity etc. 3) Composition of Blood – i) Solids ii) Fluid portion Solids :- Cellular elements Haematocrit Fluid portion Solids :- Organic constituents Inorganic constituents 4) Functions 5) Plasma Proteins	Dr. NNSirdesai
9	13/09/17	Transport across the cell membrane-II	Other Passive Transport Mechanisms **II) Active transport mechanisms** Definition , Types- **a)Primary Active Transport -** Definition Examples – Na^+- K^+ pump –Diagram, explanation & functions, Ca pump, proton pump. **b) Secondary Active Transport-Definition** Types- i) Co-transport – Diagram with examples ii) Counter-transport - Diagram with examples 4) Transport through the cellular sheet	Dr. MS Karandikar

			5) Other transport- a) Endocytosis– Pinocytosis , Phagocytosis b)Exocytosis	
10	14/09/17	RBC – I	1) Introduction 2) Morphology- size, shape & volume 3) Life span and fate of RBCs 4) Normal count 5) Physiological variations of RBCs 6) Functions of RBCs	Dr. NB Prasad
11	15/09/17	RBC-II	1) Erythropoiesis- Defination 2) Stages of Erythropoiesis. 3) Factors necessary for erythropoiesis	Dr. NB Prasad
12	16/09/17	Resting membrane potential	1) Body composition 2) Donnan's equilibrium 3) Membrane potential – Basic physics of membrane potential. 4) Resting membrane potential (RMP)-Definition Normal values in different tissues Importance , Genesis of RMP Diffusion potential calculated by Nernst potential Goldman-Hodgkin-Katz equation. -86 mv Potential calculated by Na^+- K^+ pump - 4 mv - 90 mv	Dr. SS Jadhav
13	18/09/17	Indian ethos & tradition		Dr. NB Prasad
14	19/09/17	WBC	1) Introduction 2) Classification of W.B.C.s 3) Morphology of W.B.C.s 4) Arneth count, Absolute count 5) Normal count 6) Physiological Variations in normal count 7) Life span of WBCs 8) Fate of WBCs - 9) Properties of WBCs – 10) Functions of WBCs 11)Leucopoiesis- 12) Factors regulating leucopoiesis.	Dr. ST Methre
15	19/09/17	Action Potential -I	1) Definition 2) Stages of the action potential. 3) Ionic basis of depolarization & repolarization 4) Parts of action potential 5) Different types of action potential with diagram	Dr. VG Jaltade
16	20/09/17	Action Potential -II	1) Properties of action potential 2) Signals transmission through large myaelinated	Dr. VG Jaltade

			nerve fiber-By Salutatory conduction. 3) Record – cathode Ray oscilloscope (CRO) 4) Types of record 5) Factors affecting action potential-	
17	21/09/17	Reticuloendothelial system	1) Lymphoid Tissue 2) Tissue macrophage system 3) Lymphocyte 4) Plasma cells 5) Functions of spleen	Dr. SR Salvi
18	23/09/17	Immunity I	1) Definition and Necessity 2) Classification 3) Importance of lymphoid tissue 4) Development of immune system 5) Specificity of immune system 6) Mechanism of tolerance 7) Cellular immunity 8) Mechanism of action of sensitized T cell.	Dr. RS Sood
19	25/09/17	Immunity II	1) Humoral immunity 2) Formation of immunoglobulin – Steps. 3) Different types – IgA, IgD, IgG, IgE, IgM. 4) Structure of immunoglobulin 5) Mechanism of action of immunoglobulin 6) Activation of complement – cascade reaction , amplification. 7) Primary & secondary response 8) Immunization a) Active b) Passive 9) Harmful immune response 10) Differences between cellular & humoral immunity.	Dr. RS Sood
20	26/09/17	Haemostasis – I	1) Definition 2) Mechanism of Haemostasis 3) Platelets :, morphological feature Applied – Thrombocytopenic Purpura.	Dr. PD Khuje
21	26/09/17	Blood group –I	1) Introduction 2) Importance of blood groups. 3) Types of blood groups: 4) ABO blood group system Inheritance of A, B, O blood groups : genotype & phenotype. Land steiner's Law & ABO blood group system. ABO incompatibility.	Dr. Ramya J.
22	27/09/17	Haemostasis – II	1) Coagulation a) Definition , Factors , General mechanism	Dr. PD Khuje

			2) Formation of Prothrombin activator by: a) Extrinsic Pathway b) Intrinsic Pathway 3)Applied – a) Haemophilia b) Liver disease and Vitamin K deficiency 4) Anticoagulants 5) Applied	
23	28/09/17	Blood group- II	1) Rh blood group system 2) Rh incompatibility 3) Erythroblastosisfoetalis-etiology, clinical picture, treatment, prevention. 4) Blood group.- Typing.& cross- matching 5) Blood transfusion	Dr. Ramya J.
24	03/10/17	Classification of muscle & structure of skeletal muscle	1) Muscle: Specialized cell converts chemical energy into mechanical energy. 2) Classification: Site :- Microscopic Control 3) Structure of skeletal muscle: Sarcomere: Muscle Proteins: Contractile Regulatory Structural Myosin filament: Actin filament: 'F' action Tropomyosin Troponin 4) Sarcotubular system 5) Excitation Contraction coupling	Dr. NB Prasad
25	03/10/17	Neuromuscular junction	1) Functional anatomy of neuromuscular junction 2) Neuromuscular transmission 3) Effects of drugs on neuromuscular junction 4) Applied	Dr. AN Patil
26	04/10/17	Molecular basis of Muscle contraction- I	1) Steps involved in crossbridge cycling leading to contraction of Muscle. 2) Sliding filament theory for muscle contraction Walk along theory of muscle contraction : Ratchet theory of muscle contraction: 3) Role of ATP in Muscle contraction: 4) Relaxation 5) Applied	Dr. SS Jadhav
27	05/10/17	Molecular basis of Muscle contraction- II	Electrical changes , Mechanical changes , Thermal changes , Chemical changes , Oxygen debt , Efficiency of muscle , Properties of muscle , A comparison of skeletal cardiac & smooth muscle.	Dr. SS Jadhav

28	07/10/17	Properties of skeletal muscle	Properties - 1)Excitability 2)Contractility & conductivity 3)All or none law 4) Refractory period 5) Muscle fatigue	Dr. SR Salvi
29	09/10/17	Introduction to Cardiovascular system	1) Structure of Heart Functional Anatomy 2) Shape, Size structure & functions of pericardium, Myocardium and Endocardium. 3) Specialized Tissues of the heart (conducting tissues). 4) Valves of the heart, Structure, functions of Mitral, Tricuspid Pulmonary & Aortic. 5) Properties of Cardiac muscle. 6) Differences between cardiac muscle and skeletal muscle. 7) General Introduction to systemic, Pulmonary circulation and various vessels arteries, veins and lymphatics.	Dr. NN Sirdesai
30	10/10/17	Origin & spread of cardiac impulse	1) Specialised conducting system of heart 2) Definition of Cardiac impulse. 3) SA node 4) AV node 5) Purkinje system 6) Spread of wave of depolarization in different parts of heart. 7) Applied Physiology	Dr. VG Jaltade
31	10/10/17	Nerve supply of Heart & Heart rate- I	**Heart rate** 1) Heart rate a) Normal value and physiological variations. b) Pathological variations. 2) Regulation of heart rate Innervations of heart Parasympathetic supply , Sympathetic supply Medullary Cardiovascular centre – Vasomotor centre Vasoconstrictor (C1) , Vasodilator area (A1), Sensory area Cardiovascular reflexes Applied	Dr. MS Karandikar
32	11/10/17	Nerve supply of Heart & Heart rate- II	Parasympathetic supply , Sympathetic supply Medullary Cardiovascular centre – Vasomotor centre Vasoconstrictor (C1) , Vasodilator area (A1), Sensory area Cardiovascular reflexes Applied	Dr. MS Karandikar

33	12/10/17	ECG	1) Introduction 2) Depolarization and repolarization waves. 3) Methods for recording ECG. 4) Flow of current around the heart during cardiac cycle. 5) ECG leads. 6) Einthoven's law 7) Normal ECG waves and their interpretation. 8) Applied.	Dr. NB Prasad
34	14/10/17	Cardiac cycle I	Definition: Atrial Events – Systole & Diastole Ventricular Events – Systole & Diastole **TOPIC – HEART SOUNDS** Introduction. Causes of heart sounds Description of heart sounds and duration, frequency and causes. Difference between Ist and IInd heart sounds.	Dr. PD Khuje
35	**16/10/17 To 21/10/17**	**Diwali Vacation**		
36	**23/10/17 To 25/10/17**	**1st Continuous Assessment Examination**		
37	26/10/17	Cardiac cycle II	Pressure volume changes in heart 1) Pressure volume changes in Atria, Atrial pressure curves,Jugular venous pulse tracing and significance of its waves. 2) Ventricular pressure volume changes. 3) Aortic pressure wave.	Dr. PD Khuje
38	28/10/17	Physiology of blood vessels	1) Function of circulation. 2) Functions of heart. 3) Variations in blood flow. 4) Importance of blood flow. 5) Functions of endothelium 6) Organization and functions of vascular system. 7) Local control of blood flow	Dr. ST Methre
39	30/10/17	Haemodynamics - I	Physical characteristics of blood flow Basic theory of circulatory functions.	Dr. VG Jaltade
40	31/10/17	Blood pressure I	1) Definition 2) Normal values for various age groups. 3) Role of blood pressure in body. 4) Physiological variations 5) Measurement , brief description	Dr. RS Sood

			6) Factors maintaining blood pressure- 7)Short term regulation of blood pressure	
41	31/10/17	**SGT**	**Cardiac cycle**	**All teachers**
42	01/11/17	Haemodynamics - II	Inter-relationship among pressure, flow and resistance Poiseuille- Hagen formula, Reynolds no., Critical closing pressure,Law of Laplace	Dr. VG Jaltade
43	02/11/17	Blood pressure II	1) Long Term mechanisms for control of blood pressure. 2) Role of hormones in regulating blood pressure Adrenaline, non-adrenaline, T3, T4, Aldosterone, vasopressin, serotonin, Bradykinin, prostaglandins & histamine 3) Applied Hypertension, Hypotension	Dr. RS Sood
44	06/11/17	Tissue fluid formation I	1) Introduction. 2) Body fluid compartments. Measurement of body fluid volume 3) Interstitium& interstitial fluid. 4) Starling's forces - Capillary pressure, Interstitial fluid pressure, Plasma colloid osmotic pressure, Interstitial colloid osmotic pressure	Dr. Ramya J.
45	07/11/17	Tissue fluid formation II	1) Starling's equilibrium. 2) Filtration coefficient. 3) Lymphatic system 4) Applied –Oedema	Dr. Ramya J.
46	07/11/17	Cardiac output I	1) Definition of cardiac output, Normal value 2) Various terminologies – stroke volume, cardiac index, cardiac reserve, end diastolic volume, end systolic volume 3) Distribution of cardiac output 4) Regulation of cardiac output Cardiac output = stroke volume X heart rate Regulation of stroke volume Intrinsic regulation-Myocardial contractility Extrinsic regulation Regulation of venous return	Dr. PD Khuje
47	08/11/17	Cardiac output II	Regulation of heart rate 1) Methods for measurement of cardiac output 2) Physiological variations in cardiac output 3) Effect of exercise on cardiac output – athletes, non-athletes Pathological variation in cardiac output	Dr. PD Khuje

48	09/11/17	Coronary circulation	Functional Anatomy Peculiarities of coronary circulation Factors determining coronary blood flow Measurement of coronary blood flow Applied	Dr. SS Jadhav
49	11/11/17	Circulatory shock	Definition , Classification , Stages of shock Hypovolemic shock , Causes Stages of shock –Neurogenic shock , Anaphylatic shock, Septic shock Clinical – Effect of shock on body Physiological basis of treatment	Dr. SR Salvi
51	13/11/17 to 15/11/17	**2nd Continuous Assessment Examination**		
52	16/11/17	Introduction to respiratory system	Functional anatomy, Respiratory unit, Innervations, Non-respiratory functions	Dr. ST Methre
53	18/11/17	Pulmonary circulation	Functional Anatomy Pulmonary capillary dynamics Peculiarities, Applied	Dr. NN Sirdesai
54	20/11/17	Mechanics of respiration I	Functions of respiration, mechanics- Definition, Pulmonary ventilation, Muscle of inspiration & their functions, Muscles of expiration & their function, Various pressure in respiratory system, Intrapleural pressure changes during respiration	Dr. NG Borade
55	21/11/17	Mechanics of respiration II	Lung volume & capacities , pulmonary elastic tissue , Alveolar surface tension , Surfactant , Compliance, Work of breathing , Dead space	Dr. NG Borade
56	21/11/17	**SGT**	**Circulatory Shock**	**All teachers**
57	22/11/17	Diffusion of gases	Introduction to diffusion of gases , Partial pressure of gases , Net diffusion ,Factors affecting net diffusion, Composition of alveolar air , respiratory membrane , Difference of gases, Diffusing capacity of O2 & CO2 , Ventilation perfusion ratio, Physiologic shunt , Physiologic dead space	Dr. MS Karandikar
58	23/11/17	Transport of O2	Composition & partial pressure of O2 & CO2 in lung. Lung Hb- O2 dissociation curve , Factors causing - shift to right & shift to left	Dr. SS Jadhav
59	25/11/17	Transport of CO2	In blood transport in different forms, Haldane effect , Chloride shift , Applied	Dr. Neelam P.
60	27/11/17	Neural regulation of respiration	Centers of respiration , Various lung reflexes , Effect of higher centers on respiratory centers , Peripheral reflexes	Dr. VG Jaltade

61	28/11/17	Chemical regulation of respiration	Normal partial pressure of O2 , CO2 & PH of blood , Central chemoreceptors, Peripheral chemoreceptor, Situitation& role of these receptors in normal respiration, Applied	Dr. RS Sood
62	28/11/17	**Students' Seminar on Blood Pressure**		Dr. NN Sirdesai
63	29/11/17	Hypoxia, Periodic breathing, Dyspnoea& Cyanosis-	Hypoxia – Classification, effect of hypoxia, Cyanosis- Classification, Factors affecting , Significance of Cyanosis, Periodic breathing	Dr. RS Sood
64	30/11/17	Acclimatization to high altitude	High altitude**,** Changes during acclimatization , Adaptation of high altitude , Acute mountain sickness , Chronic mountain sickness	Dr. MS Karandikar
65	02/12/17	Aviation and space physiology-I	Aviation:-Introduction, Environmental impact, Effect of acceleratory(Linear)forces on the body, Decelerative forces during parachute jumps	Dr.NG Borade
66	04/12/17	Aviation and space physiology-II	Space:- Introduction, Measurement of acceleratory force-G, Effect of centrifugal acceleratory force on the body, Protection against centrifugal acceleration, Artificial climate insealed spacecraft, Weightless in space-Microgravity, Cardiovascular, skeletal muscle and bone deconditioning during prolonged exposure	Dr.NG Borade
67	05/12/17	Cardio respiratory changes during exercise	1) Exercise – Types & grading 2) Muscles in exercise – Strength , power & endurance 3) Oxygen consumption 4) Oxygen deficit & oxygen debt 5) Cardiovascular responses to exercise 6) Respiratory responses to exercise 7) Changes at tissue level 8) Endocrinal responses to exercise 9) Effects of training	Dr. MS Karandikar
68	05/12/17	SGT	Regulation of respiration	All teachers
69	07/12/17	Structure & Functions of kidney & Renal circulation	Functional unit of kidney, Renal corpuscles , Renal tubule, Different types of nephron, Peculiarities of renal circulation, Functions of kidneys	Dr. NB Prasad
70	09/12/17	Urine formation I	Glomerular filtration rate – Definition of GFR, normal value , methods of determination of GFR , Glomerular membrane, Various forces , filtration factors , filtration coefficient, Various dynamics , factors affecting GFR , regulation of GFR	Dr. A.N Patil
71	11/12/17	Urine formation II	Tubular functions , Tubular reabsorption , Tubular secretion - clearance tests.	Dr. A.N Patil

72	12/12/17	Urine formation III (Counter current mechanism)	Introduction , Importance, Mechanism for excretion of dilute urine, Mechanism for excretion of concentrated urine, Obligatory urine volume , Disorders of urinary concentrating ability	Dr. A.N Patil
73	12/12/17	Regulation of blood volume	1) Definition 2) Normal volume – 5 liters 3) Distribution of blood in various regions 4) Physiological variation 5) Pathological variation 6) Regulation of blood volume 7) Measurement of blood volume.	Dr. VG Jaltade
74	13/12/17	Micturition reflex & its disorders	Definition, Anatomy of bladder, Innervation of bladder, Cystometrogram, Micturition reflex, Abnormalities of Micturition Diuretics , Dialysis	Dr. N.N Sirdesai
75	14/12/17 to 20/12/17	**Terminal Practical examination**		
76	21/12/17 to 23/12/17	**Terminal Theory examination**		
77	26/12/17 to 30/12/17	**Winter vacation**		

Dr.(Mrs.) N. G. Borade
Prof.& HOD