**Topic: General Physiology Number of competencies: (09)   Number of procedures that require certification(NIL)**

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| **No.** | **COMPETENCY** **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 1.1** | **Describe the structure and functions of a mammalian cell** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe basic cellular organisation of mammalian cell |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to enumerate the functions of various cell organelles |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe the structure of cell membrane in detail |  |  |  |  |  |  |  |  |
| **PY 1.2** | **Describe and discuss the principles of homeostasis** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to understand the concept of homeostasis  |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to know the concept of Milieu Interior |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able describe feedback mechanisms of homeostatic regulation with examples |  |  |  |  |  |  |  |  |
| **PY 1.3** | **Describe intercellular communication**  | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to discuss various types of intercellular communication |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students may be able to describe second messenger systems |  |  |  |  |  |  |  |  |
| **PY 1.4** | **Describe apoptosis – programmed cell death** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  | **Pathology**  |  |
| Obj 1.  | At the end of session, Phase I students must be able to define apoptosis |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of session, Phase I students must be able to differentiate between apoptosis and necrosis |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students may be able to explain the mechanism and importance of apoptosis |  |  |  |  |  |  |  |  |
| **PY 1.5** | **Describe and discuss transport mechanisms across cell membranes** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to enumerate common ion channels and carrier proteins in cell membrane |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to classify transport processes across cell membrane and describe main features of each form of transport |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe physiological applications with examples for each transport process |  |  |  |  |  |  |  |  |
| **PY 1.6** | **Describe the fluid compartments of the body, its ionic composition & measurements** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  | **Biochemistry**  |
| Obj 1.  | At the end of session, Phase I students must be able to define different body fluid compartments with their ionic composition |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to list the features of “ideal” indicator to measure body fluid compartments |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must know basic principles and methods of measuring different body fluid compartments |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to describe fluid balance between intracellular and extracellular compartments |  |  |  |  |  |  |  |  |
| **PY 1.7** | **Describe the concept of pH & Buffer systems in the body** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  | **Biochemistry**  |
| Obj 1. | At the end of session, Phase I students must be able to define pH, pK, acid, alkali and buffer |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to explain basic concept of acid- base balance |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to enumerate various buffer systems of body  |  |  |  |  |  |  |  |  |
| **PY1.8** | **Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to understand concept of RMP |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to explain the contribution of different ion movements in genesis and maintenance of RMP |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to explain Gibbs- Donnan equilibrium, Nernst equation and GHK equations |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to draw a labelled schematic diagram of nerve action potential |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to describe the ionic basis of each phase of action potential |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I Phase I, students must be able to define Absolute and Relative refractory period and its importance |  |  |  |  |  |  |  |  |
| **PY 1.9** | **Demonstrate the ability to describe and discuss the methods used to demonstrate the functions of the cells and its products, its communications and their applications in Clinical care and research** | **K** | **KH** | **Y** | **Lecture** | **Written/Viva voce** |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to describe types of Patch clamp technique |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students may be able to describe Gene therapy and Recombinant DNA technology |  |  |  |  |  |  |  |  |

**Topic: Haematology Number of competencies: (13)   Number of procedures that require certification(NIL)**

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| **No.** | **COMPETENCY** **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 2.1** | **Describe the composition and functions of blood components** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to describe the formed elements and functions of blood |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to explain composition and functions of plasma |  |  |  |  |  |  |  |  |
| **PY 2.2** | **Discuss the origin, forms, variations and functions of plasma proteins** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  | **Biochemistry**  |
| Obj 1.  | At the end of session, Phase I students must be able to enumerate various plasma proteins with their normal values and their origins |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to list the functions of plasma proteins |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to demonstrate applied aspect of alteration of concentration of plasma proteins |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students may be able to define plasmapheresis and its clinical applications |  |  |  |  |  |  |  |  |
| **PY 2.3** | **Describe and discuss the synthesis and functions of Haemoglobin and explain its breakdown. Describe variants of haemoglobin** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  | **Biochemistry**  |
| Obj 1.  | At the end of session, Phase I students must be able to describe structure and steps of synthesis of Hb |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to enumerate different types of normal and common abnormal hemoglobins |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to give normal values of Hb in males, females and in different age groups |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to list the functions of Hb |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to explain metabolism of Hb |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to enumerate common physiological and pathological alterations in Hb concentration |  |  |  |  |  |  |  |  |
| **PY 2.4** | **Describe RBC formation (erythropoiesis & its regulation) and its functions** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to define erythropoiesis and describe stages of erythropoiesis with schematic diagrams |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to explain the factors regulating erythropoiesis |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe source, mechanism of action, functions and regulation of Erythrpopoietin |  |  |  |  |  |  |  |  |
| **PY 2.5** | **Describe different types of anaemias & Jaundice** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **Pathology**  | **Biochemistry**  |
| Obj 1.  | At the end of session, Phase I students must be able to define and classify anemias on basis of their morphology and etiology with examples |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, PhaseI students must be able to explain pathophysiology of iron deficiency anemia and megaloblastic anemia |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to explain the types and causes of polycythemia |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to describe the effects of anemia and polycythemia on circulatory system |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to define jaundice and classify jaundice on basis of its cause |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to describe the biochemical tests done to investigate jaundice and their clinical interpretation |  |  |  |  |  |  |  |  |
| **PY 2.6** | **Describe WBC formation (granulopoiesis) and its regulation** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to classify WBCs with normal percentages in blood |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to list the stages of leucopoiesis |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to list functions of different types of WBCs and give conditions for physiological and pathological alterations in total and absolute counts of different WBCs |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to describe the monocyte – macrophage system and its functions |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students may be able to define and classify leukaemia |  |  |  |  |  |  |  |  |
| **PY 2.7** | **Describe the formation of platelets, functions and variations.** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe development and morphology of platelets |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to enumerate the functions of platelets |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to list the causes of thrombocytosis and thrombocytopenia |  |  |  |  |  |  |  |  |
| **PY 2.8** | **Describe the physiological basis of hemostasis and, anticoagulants. Describe bleeding & clotting disorders (Hemophilia, purpura)** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe events in hemostasis and formation of platelet plug |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to name the various clotting factors |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe the steps involved in extrinsic and intrinsic mechanism of clot formation |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to explain the process of fibrinolysis |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, PhaseI students must be able to list the disorders of blood coagulation |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to enumerate the anticoagulants with their mechanism of action |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of session, Phase I students must be able to list the investigations for detection of defects in hemostasis |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of session, Phase I students may be able to explain the pathophysiology of Hemophilia, Von Willebrand disease, purpura and DIC |  |  |  |  |  |  |  |  |
| **PY 2.9** | **Describe different blood groups and discuss the clinical importance of blood grouping, blood banking and transfusion** | **K** | **KH** | **Y** | **Lecture, small group discussion, ECE- visit to blood bank** | **Written/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of session, Phase I students must be able to classify blood groups and give physiological basis of blood grouping |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to define Landsteiner’s laws and give its physiological basis |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe agglutinogens and agglutinins in ABO and RH systems |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to able to understand the concept of universal donor, universal recipient, major and minor cross-matching |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to explain mechanism of Rh incompatibility |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to give etiology, features, and physiological basis of treatment and prevention of erythroblastosis foetalis |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of session, Phase I students must be able to list the indications for blood transfusions and precautions to be followed before blood transfusions |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of session, Phase I students must be able to describe the different transfusion reactions |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of session, Phase I students must be able to describe the method of collection of blood, storage of blood and changes occurring in stored blood. |  |  |  |  |  |  |  |  |
| **PY 2.10** | **Define and classify different types of immunity. Describe the development of immunity and its regulation** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to define and classify different types of immunity |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to classify lymphocytes with their functions |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to explain preprocessing of T and B lymphocytes in development of immunity |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to explain cellular and humoral immunity and give examples |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to explain structure of antibody molecule with help of schematic diagram |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to describe different types of antibodies with their functions |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of session, Phase I students must be able to describe the role of complement system in immunity |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of session, Phase I Phase I, students may be able to explain mechanism of immune tolerance and autoimmunity |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of session, Phase I students may be able to explain hypersensitivity and allergy |  |  |  |  |  |  |  |  |
| **PY 2.11** | **Estimate Hb, RBC, TLC, RBC indices, DLC, Blood groups, BT/CT** | **K** | **KH** | **Y** | **DOAP sessions** | **Practical/OSPE/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of session, Phase I students must be able to know the principle involved in Hb estimation by Sahli’s method |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to list the advantages and disadvantages of Sahli’s method |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students may be able to enumerate other methods of Hb estimation |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to understand the relevance of doing RBC count |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to describe composition of diluting fluid and function of each component |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to describe normal RBC count and its variation in physiological and pathological states |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of session, Phase I students must be able to indicate the importance of doing TLC |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of session, Phase I students must be able to know composition and function of each component of Turk’s fluid |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of session, Phase I students must be able to know normal TLC and its variation in physiological and pathological states |  |  |  |  |  |  |  |  |
| Obj 10. | At the end of session, Phase I students must be able to calculate various blood indices and explain their clinical significance |  |  |  |  |  |  |  |  |
| Obj 11. | At the end of session, Phase I students must be able to describe the classification of anemias based upon blood indices |  |  |  |  |  |  |  |  |
| Obj 12 | At the end of session, Phase I students must be able to prepare blood smear and stain it by leishman’s staining |  |  |  |  |  |  |  |  |
| Obj 13. | At the end of session, Phase I students must be able to describe composition of Leishman stain and functions of each component |  |  |  |  |  |  |  |  |
| Obj 14. | At the end of session, Phase I students must be able to perform DLC and name the conditions associated with variations in counts of different types of WBCs  |  |  |  |  |  |  |  |  |
| Obj 15. | At the end of session, Phase I students must be able to determine blood group typing by using commercially available antisera |  |  |  |  |  |  |  |  |
| Obj 16. | At the end of session, Phase I students must be able to describe the effects of mismatched blood transfusion |  |  |  |  |  |  |  |  |
| Obj 17. | At the end of session, Phase I students must be able to know the clinical relevance of Bleeding time(BT) and Clotting time(CT) |  |  |  |  |  |  |  |  |
| Obj 18. | At the end of session, Phase I students must be able to determine the BT and CT of self and know normal ranges |  |  |  |  |  |  |  |  |
| Obj 19.. | At the end of session, Phase I students must be able to understand the principle behind BT and CT |  |  |  |  |  |  |  |  |
| **PY 2.12** | **Describe test for ESR, Osmotic fragility, Hematocrit. Note the findings and interpret the test results etc** | **K** | **KH** | **Y** | **Demonstration**  | **Written/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of session, Phase I students must be able to explain the clinical significance of determining ESR |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to describe the methods of determination of ESR and its variation in physiological and pathological states |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to identify Wintrobe’s and Westregen’s tubes |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to describe method of determining Osmotic fragility and its importance in clinical practice |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to define osmosis, exosmosis and endosmosis |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students must be able to enumerate the clinical conditions in which osmotic fragility of RBCs is altered |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of session, Phase I students must be able to define hematocrit and its clinical significance |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of session, Phase I students must be able to list the physiological and pathological variations in hematocrit |  |  |  |  |  |  |  |  |
| **PY 2.13** | **Describe steps for reticulocyte and platelet count** | **K** | **KH** | **Y** | **Demonstration sessions** | **Written/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe the steps to calculate reticulocytes count |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to understand significance of this test and enumerate conditions associated with variation in reticulocyte count |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to describe the steps to calculate platelet count |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to understand significance of this test and enumerate conditions associated with variation in platelet count |  |  |  |  |  |  |  |  |

**Topic: Nerve and muscle Physiology Number of competencies: (18)   Number of procedures that require certification (NIL)**

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| **No.** | **COMPETENCY** **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** |
| **PY3.1**  | **Describe the structure and functions of a neuron and neuroglia;Discuss Nerve Growth Factor & other growth factors/cytokines** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  | **Human Anatomy** |
| Obj 1. | At the end of the session, Phase I students must be to draw the well labelled diagram of Neuron and explain the functions of different parts of neuron. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students Classify and draw the different types of neurons and give examples. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to Explain the process of axonal transport ,types of axonal transport and its physiological basis. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to Define neurotrophins and discuss their role in nerve growth with examples. Discuss their importance in treatment of various disorders. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of session, Phase I students must be able to Name the different glial cells and mention their functions. |  |  |  |  |  |  |  |  |
| **PY3.2** | **Describe the degeneration and regeneration in peripheral nerves**  | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I students must be to enumerate and describe the various properties of Nerve fibers . |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to give the Erlanger -Gasser Classification of Nerve fibers and mention the functions of different types of nerve fibers.  |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to classify nerve fibers on the basis of their suscceptibility to Local A, Hypoxia and Pressure. |  |  |  |  |  |  |  |  |
| **PY3.3** | **Describe the degeneration and regeneration in peripheral nerves**  | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **General medicine** |  |
| Obj 1. | At the end of the session, Phase I Student must be able to tell degenerative changes in the neuron after nerve injury and may be able to tell the grading of nerve injury. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to tell regenerative changes in the neuron after nerve injury. And the student may be able to tell the factors influencing nerve regeneration. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to Describe the phenomenon of Denervation Hypersensitivity after nerve injury. |  |  |  |  |  |  |  |  |
| **PY3.4** | **Describe the structure of neuro-muscular junction and transmission of impulses** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **Anaesthesiology** |  |
| Obj 1. | At the end of the session, Phase I Student must be able to draw a well labelled diagram of Neuro muscular junction. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to Describe the events of Neuromuscular transmission at presynaptic,synaptic and post synaptic part of NMJ.  |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to tell about End plate potential. |  |  |  |  |  |  |  |  |
| **PY3.5** | **Discuss the action of neuro-muscular blocking agents** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **Anaesthesiology. Pharmacology** |  |
| Obj 1. | At the end of the session, Phase I Student must be able to Name the various neuromuscular transmission blockers and give their mechanism and site of action. |  |  |  |  |  |  |  |  |
| **PY3.6**  | **Describe the pathophysiology of Myasthenia gravis**  | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **Pathology**  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to name the common disorders of NMJ transmission and mention their physiological basis. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to Explain the physiological basis of etiology and treatment of Myasthenia gravis and Lambert eaton syndrome. |  |  |  |  |  |  |  |  |
| **PY 3.7** | **Describe the different types of muscle fibres and their structure** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  | **Human Anatomy** |
| Obj 1. | At the end of the session, Phase I Student must be able to List the structural,morphological and functional differences between skeletal ,smooth and cardiac muscle. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to tell the differences between sarcotubular system of skeletal and smooth muscle. |  |  |  |  |  |  |  |  |
| **PY3.8** | **Describe action potential and its properties in different muscle types (skeletal & smooth)** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to describe the process of excitation in skeletal muscle (Action Potential) and smooth muscle. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to describe the properties of action potential in skeletal and smooth muscles. |  |  |  |  |  |  |  |  |
| **PY3. 9** | **Describe the mode of muscle contraction (isometric and isotonic)** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to explain the molecular mechanism of excitation-contraction coupling in skeletal and smooth muscles |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to describe the steps involved in the mechanism of cross bridge cycling in skeletal muscle and smooth muscle. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to describe the properties of smooth muscle. |  |  |  |  |  |  |  |  |
| **PY3.10** | **Describe the mode of muscle contraction (isometric and isotonic)** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to descibe the relationship between force of contraction and initial length of muscle fibers. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to explain the load- velocity relationship in skeletal muscle. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to describe the relationship between frequency of stimulation and muscle contraction. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session, Phase I Student must be able to differentiate between the isometric and isotonic contraction. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session, Phase I Student must be able give examples of isometric and isotonic contraction  |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session, Phase I Student must be able to define motor unit and explain the effect of different type of stimuli on muscle contraction. |  |  |  |  |  |  |  |  |
| **PY3.11** | **Explain the source and muscle metabolism** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  |  | **Biochemistry**  |
| Obj 1. | At the end of the session, Phase I Student must be able to name the energy sources in skeletal muscle. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to define oxygen debt |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to define muscle fatigue and enumerate the causes of muscle fatigue. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session, Phase I Student must be able to differentiate between muscle fatigue and rigor mortis. |  |  |  |  |  |  |  |  |
| **PY3.12** | **Explain the gradation of muscular activity** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **General Medicine** |  |
| Obj 1. | At the end of the session, Phase I Student must be able to explain the concept of motor recruitment and size principle. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to list the various factors which can affect the gradation of force of muscle contraction. |  |  |  |  |  |  |  |  |
| **PY 3.13** | **Describe muscular dystrophy myopathies** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written/ viva voce** |  | **General Medicine** | **Human Anatomy** |
| Obj 1. | At the end of the session, Phase I Student must be able to name and explain the physiological basis of various types of muscular dystrophies . |  |  |  |  |  |  |  |  |
| **PY****3.14** | **Perform Ergography** | **S**  | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/Viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to perform ergography and calculate the work done using mosso ergograph. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to understand the phenomenon of fatigue in forearm muscle by using mosso-ergograph |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to explain physiological basis of ergo graphy |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session, Phase I Student must be able to tell the factors that affect the genesis of fatigue in skeletal muscle after performing voluntary contractions. |  |  |  |  |  |  |  |  |
| **PY3.15** | **Demonstrate effect of mild,moderate and severe exercise and record changes in cardiorespiratory parameters**  | **S**  | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/Viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to give WHO grading of muscular exercise |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to describe the effect of mild, moderate and severe exercise on blood pressure and heart rate |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to explain the factors that cause changes in ccardiorespiratory parameters during exercise. |  |  |  |  |  |  |  |  |
| **PY3.16** | **Demonstrate Harvard Step test and describe the impact on induced physiologic parameters in simulated environment** | **S**  | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/Viva voce** |  |  |  |
| **Obj 1.** | At the end of the session, Phase I Student must be able to demonstrate the exercise tolerance test using Harvard step. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to define cardiac efficiency index and cardiac reserve. |  |  |  |  |  |  |  |  |
| **PY 3.17** | **Describe Strength -Duration Curve** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written /Viva Voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to describe strength -duration curve and its clinical significance. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to define chronaxie and rheobase |  |  |  |  |  |  |  |  |
| **PY 3.18** | **Observe with Computer assisted learning (i)Amphibian nerve (ii)Amphibian cardiac experiments** | **S** | **KH** | **Y** | **Demonstration, Computer assisted learning methods** | **Practical /Viva voce** |  |  |  |
| Obj 1. | At the end of the session, Phase I Student must be able to familiar with amphibian experiments via computer assisted learning. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session, Phase I Student must be able to describe all the uses of different apparatuses used in amphibian experiments and must be able to make the circuits in experimental lab. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session, Phase I Student must be able to tell the steps of dissection of frog's nerve-muscle preparation and frog's heart. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session, Phase I Student must know the composition of Ringer's solution used in experimental physiology. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session, Phase I Student must know all the precautions to be taken while performing different experiments in amphibian lab. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session, Phase I Student must be able to draw and explain the graph of the SMT record obtained by application of single stimulus applied to frog's nerve muscle prepration and indicate various phases of SMT using time tracing. |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session, Phase I Student must be able to draw and explain the graph of the SMT record obtained by application of single stimulus applied to frog's nerve muscle prepration and indicate various phases of SMT using time tracing. |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session, Phase I Student must be able to draw the graph and explain the graph of conduction velocity in nerve muscle preparation and know how to calculate the conduction velocity in frog's sciatic nerve. Must be able to enumerate the factors affecting conduction velocity. Must be able to tell the physiological significance of estimating nerve conduction velocity. |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session, Phase I Student must be able to draw the graph and explain the effect of two successive stimuli on different phases of muscle contraction and explain the physiological basis of beneficial effect on successive SMT's obtained. |  |  |  |  |  |  |  |  |
| Obj. 10 | At the end of the session, Phase I Student must be able to tell how to give various strength of stimuli and then draw the graph and explain the effect of increasing strength of stimuli on muscle contraction and its physiological basis.  |  |  |  |  |  |  |  |  |
| Obj. 11 | At the end of the session, Phase I Student must be able to tell how to increase the strength of stimuli and must be able to draw the graph and explain the effect of increasing the frequency of stimuli on genesis of tetanus during muscle contraction. Student may know how to calculate tetanizing frequency and may be able to tell the nature of contractions in the intact body. |  |  |  |  |  |  |  |  |
| Obj. 12 | At the end of the session, Phase I Student must be able to know types of load and draw the graph and explain the effect of Load (preload and afterload) on skeletal muscle contraction and its physiological basis with examples. Student must be able to calculate work done and optimum load. Must be able to define frank -starling's law and explain its physiological basis. |  |  |  |  |  |  |  |  |
| Obj. 13 | At the end of the session, Phase I Student must be able to tell the important structural and physiological differences between frog's and mammalian heart and Draw and explain the normal cardiogram of frog's heart. |  |  |  |  |  |  |  |  |
| Obj. 14 | At the end of the session, Phase I Student must be able to o draw the graph and explain the effect of temperature on frog's cardiogram and its physiological basis. |  |  |  |  |  |  |  |  |
| Obj. 15 | At the end of the session, Phase I Student must be able to enumerate the properties of cardiac muscle. |  |  |  |  |  |  |  |  |
| Obj. 16 | At the end of the session, Phase I Student must be able to draw the graph and explain the property of refractory period by extra-systole and compensatory pause in beating heart of frog. Must be able to tell its physiological basis. |  |  |  |  |  |  |  |  |
| Obj. 17 | At the end of the session, Phase I Student must be able to must know how to apply stannius ligatures in frog's heart and must be able to draw the graph and explain the property of Auto rhythmicity using stannius ligatures. |  |  |  |  |  |  |  |  |
| Obj. 18 | At the end of the session, Phase I Student must be able to draw the graph and explain the property of all-or-none law in frog's quiescent heart and its physiological basis. |  |  |  |  |  |  |  |  |
| Obj. 19 | At the end of the session, Phase I Student must be able to draw the graph and explain the staircase phenomenon in frog's quiescent heart  |  |  |  |  |  |  |  |  |
| Obj. 20 | At the end of the session, Phase I Student must be able to draw and explain the property of summation of subminimal stimuli in frog's quiescent heart. |  |  |  |  |  |  |  |  |
| **Topic: Gastro-intestinal Physiology Number of competencies: (10) Number of procedures that require certification: (NIL)** |
| **Number** | **Competency****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 4.1** | **Describe the structure and functions of digestive system** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  | Human Anatomy |
| Obj 1. | At the end of the session the Phase I student must be able to explain the functional anatomy of GI tract. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the Sympathetic and Parasympathetic innervation of GIT |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to describe the Organisation of Enteric nervous System |  |  |  |  |  |  |  |  |
| **PY 4.2** | **Describe the composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal juices and bile secretion** |  K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  | Biochemistry |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the phases of Alimentary tract secretions |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the salivary glands and describe the composition and functions of saliva |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to discuss the mechanism and control of salivary secretion  |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to enlist the types of gastric glands and their secretions |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session the Phase I student must be able to discuss the composition and functions of gastric juice |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session the Phase I student must be able to discuss the Mechanism of secretion of gastric juice and its regulation  |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session the Phase I student must be able to discuss the Structure of exocrine pancreas |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session the Phase I student must be able to discuss the Composition and functions of pancreatic juice |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session the Phase I student must be able to discuss the Mechanism of pancreatic juice secretion and its regulation |  |  |  |  |  |  |  |  |
| Obj 10. | At the end of the session the Phase I student must be able to discuss the Functional anatomy of Intestinal glands and know the composition and functions of intestinal secretion |  |  |  |  |  |  |  |  |
| Obj 11. | At the end of the session the Phase I student must be able to discuss the composition and functions of bile |  |  |  |  |  |  |  |  |
| Obj 12. | At the end of the session the Phase I student must be able to enumerate the various bile salts and acids and describe their Enterohepatic circulation. |  |  |  |  |  |  |  |  |
| Obj 13. | At the end of the session the Phase I student must be able to discuss the Functions and regulation of bile secretion. |  |  |  |  |  |  |  |  |
| **PY 4.3** | **Describe GIT movements, regulation and functions. Describe defecation reflex. Explain role of dietary fibre.** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the Electrophysiology of GI smooth muscle. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to describe the Mechanism of deglutition |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to discuss the Types of Gastric Motility  |  |  |  |  |  |  |  |  |
|  Obj 4. | At the end of the session the Phase I student must be able to explain the Mechanism & regulation of Gastric emptying |  |  |  |  |  |  |  |  |
|  Obj 5.  | At the end of the session the Phase I student must be able to discuss the Types of Small intestinal motility, their mechanisms and functions |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session the Phase I student must be able to describe the Intestinal reflexes |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session the Phase I student must be able to discuss the Physiology of colonic movements, colonic reflexes, and their functions |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session the Phase I student must be able to explain the Mechanism and Pathway of defecation reflex. |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session the Phase I student must be able to describe the role of dietary fibres |  |  |  |  |  |  |  |  |
| **PY 4.4** | **Describe the physiology of digestion and absorption of nutrients.** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  | Biochemistry |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the mechanisms of digestion and absorption of carbohydrate, protein, fats & other nutrients from GIT |  |  |  |  |  |  |  | Biochemistry |
| Obj 2. | At the end of the session the Phase I student must be able to describe the Physiological basis of common malabsorption syndromes |  |  |  |  |  |  |  | Biochemistry |
| **PY 4.5** | **Describe the source of GIT hormones, their regulation and functions** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to classify GI Hormones |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to describe the source, function & Regulation of GI Hormones |  |  |  |  |  |  |  |  |
| **PY 4.6** | **Describe the Gut-Brain Axis** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to describe physiological basis of gut-brain axis  |  |  |  |  |  |  |  |  |
| **PY 4.7** | **Describe & discuss the structure and functions of liver and gall bladder** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  | Biochemistry |
| Obj 1. | At the end of the session the Phase I student must be able to explain the Functional anatomy & architecture of hepatic lobule |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to enlist the Functions of liver and Gall Bladder |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to discuss the Physiological basis of gall stones formation |  |  |  |  |  |  |  |  |
| **PY 4.8** | **Describe & discuss gastric function tests, pancreatic exocrine function tests & liver function tests** | K | KH | Y | Lecture, Small group discussion, Demonstration Esophageal Manometry & endoscopy | Written/Viva voce |  |  | Biochemistry |
| Obj 1. | At the end of the session the Phase I student must be able to enlist and discuss the various Gastric function tests |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to enumerate and discuss the Pancreatic Function tests |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to enlist and discuss Liver function tests |  |  |  |  |  |  |  |  |
| **PY 4.9** | **Discuss the physiological aspects of: peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce | General Medicine |  | Biochemistry |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the Physiological basis of etiology& treatment of Peptic ulcer |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the Physiological basis of gastroesophageal reflux disease (GERD) |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to describe the Mechanism of Vomiting. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to discuss the physiological basis of various Motility disorders such as Diarrhoea, Constipation, Adynamic ileus, Hirschsprung’s Disease |  |  |  |  |  |  |  |  |
| **PY 4.10** | **Demonstrate the correct clinical examination of the abdomen in a normal volunteer or simulated environment** | S | SH | Y | DOAP session | Skill assessment/ Viva voce/OSCE |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able toIndicate the different regions of abdomen for clinical examination correctly. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to palpate the spleen, liver and kidneys correctly. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to percuss the different regions of abdomen correctly. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to auscultate the abdomen for bowel sounds correctly. |  |  |  |  |  |  |  |  |
| **Topic: Cardiovascular Physiology (CVS) Number of competencies: (16) Number of procedures that require certification: (03)** |
| **Number** | **COMPETENCY** **The student should be able to:** |

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| **Domain****K/S/A/C** |
|  |

 | **Level****K/KH/SH/P** | **Core****(Y/N)** | **Teaching-Learning****Methods** | **Assessment****Methods** | **Number****required****to certify** **P** | **Vertical****Integration** | **Horizontal****Integration** |
| PY5.1 | Describe the functional anatomy of heart including chambers, sounds; and Pacemaker tissue and conducting system. | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| Obj1 | At the end of the session, the phase I student must be able to understand the different layers of heart, Pericardium & pericardial cavity | K | KH | Y | Lecture | Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to know the four chambers of the heart and valves present inside them | K | KH | Y | Lecture | Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to know various heart sounds & how they are produced | K | KH | Y | Lecture | Viva voce |  |  |  |
| 4 | At the end of the session, the phase I student must be able to trace the conducting system of Heart & understand the pacemaker tissue | K | KH | Y | Lecture | Written |  |  |  |
| **PY5.2** | **Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| Obj1 | At the end of the session, the phase I student must be able to describe the anatomy of cardiac muscle & its role as functional syncitium | K | KH | Y | Lecture | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to appreciate the myocardial sarcotubular and contractile system | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to enumerate various properties of Heart | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 4 | At the end of the session, the phase I student must be able to describe excitability and action potential in cardiac muscles | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 5 | At the end of the session, the phase I student must be able to describe autorhythmicity& action potential in nodal tissues  | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 6 | At the end of the session, the phase I student must be able to discuss the conduction of impulse throughout the Heart | K | KH | Y | Lecture, Small groupDiscussion | Written |  |  |  |
| 7 | At the end of the session, the phase I student must be able to explain the mechanism of contraction in Cardiac muscle. | K | KH | Y | Lecture, Small groupDiscussion | Written |  |  |  |
| 8 | At the end of the session, the phase I student must be able to describe other mechanical & biophysical properties of Heart | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| **PY5.3** | **Discuss the events occurring during the cardiac cycle** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to define Cardiac cycle & list the its various phases | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to draw a diagram showing pressure, volume & ECG changes, JVP & heart sounds in different phases of Cardiac cycle | K | KH  | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to describe and correlate various electromechanical events of Cardiac cycle | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 4 | At the end of the session, the phase I student must be able to understand pressure-volume relationship of Left ventricle | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| **PY5.4** | **Describe generation, conduction of cardiac impulse** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to describe the characteristic features of nodal tissue  |  |  |  |  |  |  |  |  |
| 2 | At the end of the session, the phase I student must be able to explain the generation of cardiac impulse and its propagation along the conducting system of heart |  |  |  |  |  |  |  |  |
| **PY5.5** | **Describe the physiology of electrocardiogram (E.C.G), its applications and the cardiac axis** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  | **General Medicine** |  |
| 1. | At the end of the session, the phase I student must be able to define ECG & list its applications | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to explain the Physiological basis of ECG | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to classify ECG leads & know their physiological basis | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 4 | At the end of the session, the phase I student must be able to identify & describe different ECG waves, segments &intervals | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 5 | At the end of the session, the phase I student must be able to interpret various aspects of ECG | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 6 | At the end of the session, the phase I student must be able to determine mean QRS axis & list the common causes of axis deviation | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY5.6** | **Describe abnormal ECG, arrythmias, heart block and myocardial Infarction** | **K** | **KH** | **Y** | **Lecture, Small group****Discussion** | **Written/Viva voce** |  | **General Medicine** |  |
| Obj. 1 | At the end of the session, the phase I student must be able to classify & describe various types of Cardiac arrhythmias | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to discuss different conduction blocks in Heart | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to describe ECG changes in Myocardial Infarction & their physiological basis | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY5.7** | **Describe and discuss haemodynamics of circulatory system** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
|  | At the end of the session, the phase I student must be able to understand the role of different types of blood vessels in haemodynamics. | K | KH | Y | Lecture | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to apply the knowledge of physical principles of Hemodynamics in understanding CVS functions | K | KH | Y | Lecture | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to understand velocity, flow, pressure relation of different blood vessels |  |  |  |  |  |  |  |  |
| 5 | At the end of the session, the phase I student must be able to describe peripheral resistance and various factors affecting it |  | KH | Y | Lecture | Viva voce |  |  |  |
| **PY5.8** | **Describe and discuss local and systemic cardiovascular regulatory mechanisms** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to understand the significance of CVS regulation | K | KH | Y | Lecture, Small groupDiscussion | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to discuss neural mechanisms of CVS regulation | K | KH | Y | Lecture, Small groupDiscussion | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to discuss local & humoral mechanisms of CVS regulation | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| **PY5.9** | **Describe the factors affecting heart rate, regulation of cardiac output & blood pressure** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to define heart rate, factors affecting it and its regulation | K | KH | Y | Lecture | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to define cardiac output and how it is measured | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to describe factors affecting & regulation of cardiac output | K | KH | Y | Lecture, Small groupDiscussion | Written/Viva voce |  |  |  |
| 4 | At the end of the session, the phase I student must be able to describe Blood pressure, factors affecting and its regulation | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY5.10** | **Describe & discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  | **General Medicine** |  |
| 1 | At the end of the session, the phase I student must be able to understand the forces acting across the capillary membrane and their applied importance. | K | KH | Y | Lecture | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to describe various factors regulating microcirculation | K | KH | Y | Lecture | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to explain formation & function of Lymph & factors affecting its flow | K | KH | Y | Lecture | Viva voce |  |  |  |
| 4. | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Coronary circulation | K | KH | Y | Lecture | Written |  |  |  |
| 5 | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Cerebral circulation | K | KH | Y | Lecture | Written |  |  |  |
| 6 | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Cutaneus circulation | K | KH | Y | Lecture | Viva voce |  |  |  |
| 7 | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Fetal circulation | K | KH | Y | Lecture | Written |  |  |  |
| 8 | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Pulmonary circulation. | K | KH | Y | Lecture | Written |  |  |  |
| 9 | At the end of the session, the phase I student must be able to describe special features, regulation and applied aspect of Splanchnic circulation | K | KH | Y | Lecture | Viva voce |  |  |  |
| **PY5.11** | **Describe the patho-physiology of shock, syncope and heart failure** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to define circulatory shock and describe various stages of shock | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 2 | At the end of the session, the phase I student must be able to classify shock and discuss principles of treatment of shock | K | KH | Y | Lecture, Small groupdiscussion | Written |  |  |  |
| 3 | At the end of the session, the phase I student must be able to describe different types & pathophysiology of Cardiac failure | K | KH | Y | Lecture | Viva voce |  |  |  |
| **PY5.12** | **Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment** | **S** | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/ Viva voce** | **1 each x 3** |  |  |
| 1’ | At the end of the session, the phase I student must be able to record pulse rate & blood pressure by palpatory & auscultatory methods in basal conditions | S | SH | Y | DOAP sessions | Practical/OSPE/ Viva voce | 1 each x 3 |  |  |
| 2 | At the end of the session, the phase I student must be able to record &understand the physiological basis of blood pressure & pulse rate changes after different grades of exercise | S | SH | Y | DOAP sessions | Practical/OSPE/ Viva voce | 1 each x 3 |  |  |
| 3 | At the end of the session, the phase I student must be able to record &understand the physiological basis of blood pressure & pulse rate changes after change in body posture | S | SH | Y | DOAP sessions | Practical/OSPE/ Viva voce | 1 each x 3 |  |  |
| **PY5.13** | **Record and interpret normal ECG in a volunteer or simulated environment** | **S** | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/ Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to record & analyze the normal ECG | S | SH | Y | DOAP sessions | Practical/OSPE/ Viva voce |  |  |  |
| **PY5.14** | **Observe cardiovascular autonomic function tests in a volunteer or simulated environment** | **S** | **SH** | **Y** | **DOAP sessions** | **Skill assessment/ Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student may be able to understand the physiological basis of effect of change of posture, deep breathing & valsalva manoeuvre on heart rate & blood pressure | S | SH | Y | DOAP sessions | Skill assessment/ Viva voce |  |  |  |
| **PY5.15** | **Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or simulated environment** | **S** | **SH** | **Y** | **DOAP sessions** | **Practical/OSPE/ Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student may be able to list the headings under which CVS examination should be carried out | S | SH | Y | DOAP sessions | OSPE/ Viva voce |  |  |  |
| 2. | At the end of the session, the phase I student may be able to examine the CVS system of the subject by inspection, palpation, percussion & auscultation | S | SH | Y | DOAP sessions | OSPE/ Viva voce |  |  |  |
| **PY5.16** | **Record Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment** | **S** | **SH** | **Y** | **DOAP sessions,****Computer assisted learning methods** | **Practical/OSPE/ Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student may be able to understand the physiological basis of Arterial pulse record and describe its various features | S | SH | Y | DOAP sessions, | Practical/Viva voce |  |  |  |
| **Topic: Respiratory Physiology Number of competencies: (10) Number of procedures that require certification: (01)** |
| **PY 6.1** | **Describe the functional anatomy of respiratory tract** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the functional anatomy of the respiratory tract |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the Non-respiratory functions of Lungs |  |  |  |  |  |  |  |  |
| **PY 6.2** | **Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the mechanics of normal respiration |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the Pressure-flow-volume changes during the respiratory cycle |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to discuss the various lung volumes and capacities with their normal values |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to understand the Lung compliance and the factors affecting it |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session the Phase I student must be able to discuss the principles of airway resistance and Work of breathing |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session the Phase I student must be able to discuss the composition, functions and clinical applications of surfactant, |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session the Phase I student must be able to understand the concept of V/P Ratio and Importance of Alveolar ventilation |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session the Phase I student must be able to discuss the Diffusion capacity of lungs and factors determining it |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session the Phase I student must be able to discuss the Neural and Chemical regulation of respiration along with the role of respiratory reflexes |  |  |  |  |  |  |  |  |
| **PY 6.3** | **Describe and discuss the transport of respiratory gases: Oxygen and Carbon dioxide** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the Composition of Alveolar, inspired & expired air |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to describe the transport of oxygen in blood |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to describe the transport of CO2 in blood |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to explain the Haldane and Bohr effect |  |  |  |  |  |  |  |  |
| **PY 6.4** | **Describe and discuss the physiology of high altitude and deep-sea diving** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to describe the respiratory, cardiovascular, haematological & tissue changes at high altitude |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to describe the physiological changes that occur in deep sea diving |  |  |  |  |  |  |  |  |
| **PY 6.5** | **Describe and discuss the principles of artificial respiration, oxygen therapy, acclimatization and decompression sickness.** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to discuss the various methods of artificial respiration |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss Cardiopulmonary resuscitation. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must know the physiological basis and applications of oxygen therapy |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to describe the process of Acclimatisation at high altitude |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session the Phase I student must be able to discuss the physiological basis of acute & chronic mountain sickness |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session the Phase I student must be able to explain the mechanism of decompression sickness & physiological basis of its prevention and management |  |  |  |  |  |  |  |  |
| **PY 6.6** | **Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis, asphyxia; drowning, periodic breathing** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to describe and discuss the pathophysiology of dyspnoea , asphyxia , cyanosis and drowning |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to define and classify Hypoxia |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session the Phase I student must be able to describe the mechanism of each type of hypoxia & its management |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must know the types of abnormal breathing patterns |  |  |  |  |  |  |  |  |
| **PY 6.7** | **Describe and discuss lung function tests & their clinical significance** | K | KH | Y | Lecture, Small group discussion | Written/Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to classify the various lung function tests. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to discuss the physiological basis & applications of PFT |  |  |  |  |  |  |  |  |
| **PY 6.8** | **Demonstrate the correct technique to perform & interpret Spirometry** | S | SH | Y | DOAP sessions | Skill assessment/ Viva voce |  | Respiratory Medicine |  |
| Obj 1. | At the end of the session the Phase I student must be able to perform spirometry on Student’s Spirometer and Vitalograph |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to Interpret the various lung volumes, capacities and the pressure-volume loops  |  |  |  |  |  |  |  |  |
| **PY 6.9** | **Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment** | S | P | Y | DOAP sessions | Skill assessment/ Viva voce | 1 |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to Inspect the chest for its form and respiratory movements. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session the Phase I student must be able to Palpate the chest for position of trachea, respiratory movements and Vocal fremitus |  |  |  |  |  |  |  |  |
| Obj 3. |  At the end of the session the Phase I student must be able to percuss the lungs for the borders |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session the Phase I student must be able to Auscultate the lungs for breath sounds, added sounds and vocal resonance |  |  |  |  |  |  |  |  |
| **PY 6.10** | **Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment** | S | SH | Y | DOAP sessions | Practical/OSPE/ Viva voce |  |  |  |
| Obj 1. | At the end of the session the Phase I student must be able to measure the PEFR of the subject provided and understand the applications of PEFR |  |  |  |  |  |  |  |  |
| **Topic: Renal Physiology Number of competencies: (09) Number of procedures that require certification: (NIL)** |
| **PY7.1** | **Describe structure and function of kidney** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to enumerate the functions of kidney | K | KH | Y | Lecture,  | Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to describe the different types of nephrons & structure  | K | KH | Y | Lecture,  | Written |  |  |  |
| **PY7.2** | **Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to describe the structure of juxta glomerular apparatus | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 2. | At the end of the session, the phase I student must be able to describe the role of JG apparatus in renin-angiotensin system | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY7.3** | **Describe the mechanism of urine formation involving processes of filtration, tubular reabsorption & secretion; concentration and diluting mechanism** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to understand the terms Glomerular Filteration Rate & Renal blood flow | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to describe the determinants and regulation of GFR & RBF | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to understand the transport of various solutes & water in different parts of renal tubules | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 4 | At the end of the session, the phase I student must be able to describe the regulation of Tubular reabsorption & secretion | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 5 | At the end of the session, the phase I student must be able to describe the formation of Concentrated urine with understanding of Counter current mechanism | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 6 | At the end of the session, the phase I student must be able to describe the formation of dilute urine and role of ADH in it | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY7.4** | **Describe & discuss the significance & implication of Renal clearance** | **K** | **KH** | **Y** | **Lecture**  | **Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to describe clearance test for measurement of GFR &its significance | K | KH | Y | Lecture | Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to describe clearance test for measurement of RBF & its significance | K | KH | Y | Lecture  | Viva voce |  |  |  |
| **PY7.5** | **Describe the renal regulation of fluid and electrolytes & acid-base balance** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to understand the role of kidney in regulation of Extracellular Fluid osmolarity & sodium concentration | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to discuss renal regulation of Potassium, Calcium, Phosphate & Magnesium | K | KH | Y | Lecture  | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to understand the role of kidney in regulation of Extracellular Fluid volume | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 4 | At the end of the session, the phase I student must be able to describe the renal regulation of acid-base balance | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 5 | At the end of the session, the phase I student must be able to understand disorders of acid-base balance | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **PY7.6** | **Describe the innervations of urinary bladder, physiology of micturition and its abnormalities** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to describe the neural control of Urinary bladder | K | KH | Y | Lecture | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to describe the physiology of micturition | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 3 | At the end of the session, the phase I student must be able to discuss various abnormalities of micturition | K | KH | Y | Lecture | Viva voce |  |  |  |
| **PY7.7** | **Describe artificial kidney, dialysis and renal transplantation** | **K** | **KH** | **Y** | **Lecture** | **Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to understand the physiological basis of Dialysis and renal transplantation | K | KH | Y | Lecture  | Viva voce |  |  |  |
| **PY7.8** | **Describe & discuss Renal Function Tests** | **K** | **KH** | **Y** | **Lecture** | **Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to enumerate various tests to assess Renal functions | K | KH | Y | Lecture | Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to understand the physiological basis of each Renal function test | K | KH | Y | Lecture | Viva voce |  |  |  |
| **PY7.9** | **Describe cystometry and discuss the normal cystometrogram** | **K** | **KH** | **Y** | **Lecture, Small group****discussion** | **Written/Viva voce** |  |  |  |
| 1 | At the end of the session, the phase I student must be able to describe cystometry | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| 2 | At the end of the session, the phase I student must be able to explain the graph of cystometrogram | K | KH | Y | Lecture, Small groupdiscussion | Written/Viva voce |  |  |  |
| **Topic: Endocrine Physiology Number of Competencies (06) Number of Procedures that require certification: (NIL)** |
| **NO** | **COMPETENCY** | **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** |
| **PY8.1** | **Describe the physiology of bone and calcium metabolism** | **K** | **KH** | **Y** | **Lecture, Small group** **discussion** | **Written/****Viva voce** |  |  |  |
| OBJ 1 | At the end of session the Phase I students must be able to explain various aspects of Bone Physiology and mechanism of Bone formation with Bone resorption |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session the Phase I students must be able to explain the basics of Calcium and Phosphate metabolism  |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session the Phase I students must be able to describe the hormonal regulation of Calcium metabolism  |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session the Phase I students must be able to describe the physiological basis of Osteoporosis & Osteomalacia |  |  |  |  |  |  |  |  |
| **PY8.2** | **Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland** | **K** | **KH** | **Y** | **Lecture, Small group** **discussion** | **Written/****Viva voce** |  |  |  |
| OBJ 1 | At the end of session the Phase I students must be able to describe the anatomy of Pituitary Gland |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session the Phase I students must be able to list the Hormones produced by the Pituitary Gland |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session the Phase I students must be able to list actions of GH and the factors affecting the GH secretion |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session the Phase I students must be able to list the clinical features of Panhypopituitarism, Acromegaly, Gigantism and Dwarfism |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session the Phase I students must be able to list the actions and factors controlling the secretion of Oxytocin & Vasopressin |  |  |  |  |  |  |  |  |
| OBJ 6 | At the end of session the Phase I students must be able to describe the disorders of posterior pituitary hormone secretion  |  |  |  |  |  |  |  |  |
| OBJ 7 | At the end of session the Phase I students must be able to name hormones secreted by Thyroid Gland |  |  |  |  |  |  |  |  |
| OBJ 8 | At the end of session the Phase I students must be able to list steps involved in biosynthesis of Thyroid Hormone |  |  |  |  |  |  |  |  |
| OBJ 9 | At the end of session the Phase I students must be able to describe the mechanism of action and physiological effects of Thyroid Hormone. |  |  |  |  |  |  |  |  |
| OBJ 10 | At the end of session the Phase I students must be able to describe the mechanism of action and functions of Parathyroid Hormone. |  |  |  |  |  |  |  |  |
| OBJ 11 | At the end of session the Phase I students must be able to explain Physiological basis of dysfunction in Hyperthyroidism & Hypothyroidism |  |  |  |  |  |  |  |  |
| OBJ 12 | At the end of session the Phase I students must be able to describe the physiological anatomy of Parathyroid Gland |  |  |  |  |  |  |  |  |
| OBJ 13 | At the end of session the Phase I students must be able to describe the mechanism of action and functions of Parathyroid Hormone. |  |  |  |  |  |  |  |  |
| OBJ 14 | At the end of session the Phase I students must be able to understand the Physiological basis of dysfunction of PTH. |  |  |  |  |  |  |  |  |
| OBJ 15 | At the end of session the Phase I students must be able to describe the mechanism of action and function of Calcitonin. |  |  |  |  |  |  |  |  |
| OBJ 16 | At the end of session the Phase I students must be able to describe the functions of Vit. D. |  |  |  |  |  |  |  |  |
| OBJ 17 | At the end of session the Phase I students must be able to describe the role of various hormones in Calcium metabolism |  |  |  |  |  |  |  |  |
| OBJ 18 | At the end of session the Phase I students must be able to give the functional anatomy of Adrenal Gland and the hormones secreted by it |  |  |  |  |  |  |  |  |
| OBJ 19 | At the end of session the Phase I students must be able to give the steps of synthesis of Adrenocortical hormones  |  |  |  |  |  |  |  |  |
| OBJ 20 | At the end of session the Phase I students must be able to describe the regulation of secretion, mechanism of action, functions of Glucocorticoids and Mineralocorticoid hormones |  |  |  |  |  |  |  |  |
| OBJ 21 | At the end of session the Phase I students must be able to describe the physiological importance of Cortisol . |  |  |  |  |  |  |  |  |
| OBJ 22 | At the end of session the Phase I students must be able to understand the physiological basis of dysfunction caused by excess and deficiency of Glucocorticoids. and mineralocorticoid hormones |  |  |  |  |  |  |  |  |
| OBJ 23 | At the end of session the Phase I students must be able to outline the functions of adrenal sex steroid. |  |  |  |  |  |  |  |  |
| OBJ 24 | At the end of session the Phase I students must be able to describe the physiological basis of Adrenogenital and Virilisation syndrome. |  |  |  |  |  |  |  |  |
| OBJ 25 | At the end of session the Phase I students must be able to give the steps of synthesis of Catecholamines (CA) |  |  |  |  |  |  |  |  |
| OBJ 26 | At the end of session the Phase I students must be able to list the factors which control the secretion of CA from Adrenal Medulla. |  |  |  |  |  |  |  |  |
| OBJ 27 | At the end of session the Phase I students must be able to describe the Physiological effects of CA. |  |  |  |  |  |  |  |  |
| OBJ 28 | At the end of session the Phase I students must be able to explain the clinical features of Pheochromocytoma |  |  |  |  |  |  |  |  |
| OBJ 29 | At the end of session the Phase I students must be able to explain the effect of various hormones in Stress. |  |  |  |  |  |  |  |  |
| OBJ 30 | At the end of session the Phase I students must be able to list the hormones secreted from endocrine Pancreas  |  |  |  |  |  |  |  |  |
| OBJ 31 | At the end of session the Phase I students must be able to describe the synthesis, regulation of secretion and metabolism of Insulin. |  |  |  |  |  |  |  |  |
| OBJ 32 | At the end of session the Phase I students must be able to enumerate GLUTs |  |  |  |  |  |  |  |  |
| OBJ 33 | At the end of session the Phase I students must be able to describe the functions of Insulin. |  |  |  |  |  |  |  |  |
| OBJ 34 | At the end of session the Phase I students must be able to describe different types of DM |  |  |  |  |  |  |  |  |
| OBJ 35 | At the end of session the Phase I students must be able to explain physiological basis of features, treatment and complications of DM. |  |  |  |  |  |  |  |  |
| OBJ 36 | At the end of session the Phase I students must be able to describe the biological actions of Glucagon. |  |  |  |  |  |  |  |  |
| OBJ 37 | At the end of session the Phase I students must be able to give the important function of Somatostatin and Pancreatic polypeptide. |  |  |  |  |  |  |  |  |
| **PY 8.3** | **Describe the physiology of Thymus & Pineal Gland** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  |  |
| OBJ 1 | At the end of session the Phase I students must be able to explain the development and functions of Thymus |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session the Phase I students must be able to describe the role of Pineal gland in Circadian Rhythm. |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session the Phase I students must be able to list the hormone secreted from Pineal Gland. |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session the Phase I students must be able to describe the functions of Pineal gland. |  |  |  |  |  |  |  |  |
| **PY 8.4** | **Describe function tests: Thyroid gland; Adrenal cortex, Adrenal****medulla and pancreas** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  | **Biochemistry** |
| OBJ 1. | At the end of session the Phase I students must be able to describe the Thyroid function tests  |  |  |  |  |  |  |  |  |
| OBJ 2. | At the end of session the Phase I students must be able to describe the Adrenal function tests  |  |  |  |  |  |  |  |  |
| OBJ 3. | At the end of session the Phase I students must be able to describe the Pancreatic function tests  |  |  |  |  |  |  |  |  |
| **PY8.5** | **Describe the metabolic and endocrine consequences of obesity & metabolic syndrome, Stress response. Outline the psychiatry component pertaining to metabolic syndrome.** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  |  |
| OBJ 1 | At the end of session the Phase I students must be able to describe the effect of obesity on carbohydrate& lipid metabolism |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session the Phase I students must be able to describe metabolic syndrome |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session the Phase I students must be able to explain the deleterious effect of stress hormones on metabolism  |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session the Phase I students must be able to describe the psychosocial aspect of Metabolic Syndrome. |  |  |  |  |  |  |  |  |
| **PY 8.6** | **Describe & differentiate the mechanism of action of steroid, protein****and amine hormones** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  |  |
| OBJ 1 | At the end of session the Phase I students must be able to explain the mechanism of action of different hormones |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session the Phase I students must be able to describe the intracellular sequence of events of actions of various hormones |  |  |  |  |  |  |  |  |
| **TOPIC : REPRODUCTIVE PHYSIOLOGY NO OF COMPETENCIES: 12 Number of Procedures that require certification: (NIL)** |
| **NO** | **COMPETENCY** | **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 9.1** | **At the end of session the Phase I students must be able to describe and discuss sex determination; sex differentiation and****their abnormities and outline psychiatry and practical implication of sex determination** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  | **Human Anatomy** |
| Obj 1 | At the end of session the Phase I students must be able to describe the physiology of sex determination and sex differentiation in males and females |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of session the Phase I students must be able to list the abnormalities of sex determination and sex differentiation with physiological basis of its causation |  |  |  |  |  |  |  |  |
| PY 9.2 | **Describe and discuss puberty: onset, progression, stages; early and****delayed puberty and outline adolescent clinical and psychological association** | **K** | **KH** | **Y** | **Lecture, Small group discussion** | **Written/Viva voce** |  |  |  |
| Obj 1. | At the end of session the Phase I students must be able to describe the physiological changes of puberty in males and females |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to discuss the stages of puberty in males and females |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to understand the neuro-physiological mechanism of onset of puberty |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to explain the mechanism of precocious and delayed puberty with clinical and psychological association |  |  |  |  |  |  |  |  |
| **PY 9.3** | **Describe male reproductive system: functions of testis and control of****spermatogenesis & factors modifying it and outline its association with** **psychiatric illness.** | **K** | **KH** | **Y** | **Lecture, Small group** **discussion** | **Written/****Viva voce** |  |  |  |
| Obj 1. | At the end of session, Phase I Students must be able to describe the different parts of male reproductive system & give functions of each |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I Students must be able to list the functions of Sertoli cells and Leydig Cells |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of session, Phase I students must be able to understand the importance of blood testicular barrier in testicular functions. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to name the steps of spermatogenesis and describe the mechanism and regulation of spermatogenesis |  |  |  |  |  |  |  |  |
| Obj 5. |  At the end of session, Phase I students must be able understand the importance of semen analysis |  |  |  |  |  |  |  |  |
| Obj6. | At the end of session, Phase I students must be able to understand the psychiatric implications of disorders of Spermatogenesis |  |  |  |  |  |  |  |  |
| **PY9.4** | **Describe female reproductive system: (a) functions of ovary and its****control; (b) menstrual cycle - hormonal, uterine and Ovarian changes** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe the different parts of female reproductive tract and list their functions. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to give steps of oogenesis and describe regulation of different phases of Ovarian Cycle |  |  |  |  |  |  |  |  |
| Obj 3 | At the end of session, Phase I students must be able to describe the functions of corpus luteum. |  |  |  |  |  |  |  |  |
| Obj 4 | At the end of session, Phase I students must be able to list the tests of Ovulation. |  |  |  |  |  |  |  |  |
| Obj 5 | At the end of session, Phase I students may be able to explain the physiological basis of various methods of contraception. |  |  |  |  |  |  |  |  |
| Obj 6 | At the end of session, Phase I students must be able to describe the uterine and ovarian changes in different phases of Menstrual cycle. |  |  |  |  |  |  |  |  |
| Obj 7 | At the end of session, Phase I students must be able to understand the hormonal regulation of Menstrual Cycle |  |  |  |  |  |  |  |  |
| **PY 9.5** | **Describe and discuss the Physiological effects of sex hormones.** |  |  |  |  |  |  |  |  |
| Obj 1 | At the end of session, Phase I students must be able to describe the functions, mechanism of action and regulation of Estrogen, Progesterone, and Testosterone.. |  |  |  |  |  |  |  |  |
| Obj 2 | At the end of session, Phase I students may be able to describe the regulation of functions of Testosterone and Hypothalamo-pitutary-gonadal axis in males. |  |  |  |  |  |  |  |  |
| Obj 3 | At the end of session, Phase I students must be able to list the functions of Ovarian hormones Estrogen and Progesterone |  |  |  |  |  |  |  |  |
| **PY9.6** | **Enumerate the contraceptive methods for male and female. Discuss****their advantages & disadvantages** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to define and classify contraceptives for males and females |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I student must be able to name the temporary and permanent methods of contraception  |  |  |  |  |  |  |  |  |
| Obj 3.  | At the end of session, Phase I students must be able to give the mechanism of action of contraception |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I student may be able to describe the advantages and disadvantages of different types of contraceptives |  |  |  |  |  |  |  |  |
| **PY 9.7** | **Describe and discuss the effects of removal of gonads on****physiological functions** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe the effect of removal of gonads on sexual functions |  |  |  |  |  |  |  |  |
| **PY 9.8** | **Describe and discuss the physiology of pregnancy, parturition &****lactation and outline the psychology and psychiatry-disorders****associated with it**. |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe the physiological changes during pregnancy  |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to describe the structure of placenta, list the placental hormones and mention their functions  |  |  |  |  |  |  |  |  |
| Obj 3.  | At the end of session, Phase I students must be able to discuss mechanics of parturition and factors that increase the uterine contractility at birth  |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of session, Phase I students must be able to describe the hormonal regulation of breast development and lactation  |  |  |  |  |  |  |  |  |
| Obj 5.  |  At the end of session, Phase I students must be able to describe milk ejection reflex with schematic diagram |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of session, Phase I students may be able to explain the psychiatric implications of complications associated with pregnancy, parturition and lactation |  |  |  |  |  |  |  |  |
| **PY 9.9** | **Interpret a normal semen analysis report including (a) sperm count,****(b) sperm morphology and (c) sperm motility, as per WHO guidelines** |  |  |  |  |  |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to define infertility and list the causes of infertility |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be be able to enumerate the abnormalities of semen analysis |  |  |  |  |  |  |  |  |
| **Obj 3.** | At the end of session, Phase I students must be able to interpret normal semen analysis report as per WHO guidelines |  |  |  |  |  |  |  |  |
| **PY 9.10** | **Discuss the physiological basis of various pregnancy tests** |  |  |  |  |  |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to list various pregnancy tests  |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of session, Phase I students must be able to describe the physiological basis of pregnancy tests  |  |  |  |  |  |  |  |  |
| **PY9.11** | **Discuss the hormonal changes and their effect during perimenopause and menopause** |  |  |  |  |  |  |  |  |
| Obj 1.  | At the end of session, Phase I students must be able to describe the hormonal changes in Perimenopause and Menopause  |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of session, Phase I students may be able to describe the clinical features of Perimenopause and Menopause  |  |  |  |  |  |  |  |  |
| **PY 9.12** | **Discuss the common causes of infertility in a couple and role of IVF****in managing a case of infertility.** |  |  |  |  |  |  |  |  |
| Obj 1. | At the end of session, Phase I students must be able to describe /list various causes of infertility in a couple  |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of session, Phase I students must be able to describe the role of IVF in infertility  |  |  |  |  |  |  |  |  |
| **TOPIC: NERVOUS SYSTEM ( NEUROPHYSIOLOGY ) NUMBER OF COMPETENCIES: 20** |
| **Number** | **Competency** | **Domain****K/S/A/C** | **Level****K/KH/SH/P** | **Core****Y/N** | **Suggested teaching** **Learning method** | **Suggested assesment method** | **Number required to certify** | **Vertical****integration** | **Horizontal integration** |
| **PY 10.1** | **Describe and discuss the organization of Nervous System** | **K** | **KH** | **Y** | **Lecture,small group discussion** | **Written /Viva-voce** |  |  |  |
| Obj 1 | At the end of the session Phase 1 student must be able to enumerate the functions of the nervous system. |  |  |  |  |  |  |  |  |
| Obj 2 | At the end of the session Phase 1 student must be able to Explain the meanings of various terms used in Nervous System. |  |  |  |  |  |  |  |  |
| Obj 3 | At the end of the session Phase 1 student must be able to classify the nervous system on the basis of structure and function. |  |  |  |  |  |  |  |  |
| Obj 4 | At the end of the session Phase 1 student must be able to reproduce the various parts of brain and the spinal cord. |  |  |  |  |  |  |  |  |
| Obj 5 | At the end of the session Phase 1 student must be able to enumerate the functions of each part of brain and spinal cord. |  |  |  |  |  |  |  |  |
| Obj 6 | At the end of the session Phase 1 student must be able to describe the structure of neurons and the classification of neurons. |  |  |  |  |  |  |  |  |
| Obj 7 | At the end of the session Phase 1 student must be able to reproduce the structure and functions of various neuroglial cells. |  |  |  |  |  |  |  |  |
| Obj 8 | At the end of the session Phase 1 student must be able to explain the synthesis, composition and clinical importance of CSF. |  |  |  |  |  |  |  |  |
| **PY 10.2** | **Describe and discuss the functions and properties of Synapse, reflex and receptors** | K | KH | Y | Lecture , Small group Discussion  | Written /Viva voce |  |  | Human Anatomy |
| Obj 1 | At the end of the session Phase 1 student must be able to enumerate the classification of synapses. |  |  |  |  |  |  |  |  |
| Obj 2 | At the end of the session Phase 1 student must be able to describe the structure of synapse. |  |  |  |  |  |  |  |  |
| Obj 3 | At the end of the session Phase 1 student must be able to explain transmission across the synapse |  |  |  |  |  |  |  |  |
| Obj 4 | At the end of the session Phase 1 student must be able to describe the properties of the synapse. |  |  |  |  |  |  |  |  |
| Obj 5 | At the end of the session Phase 1 student must be able to Reproduce various terms used in the description of the sensory system. |  |  |  |  |  |  |  |  |
| Obj 6 | At the end of the session Phase 1 student must be able to enumerate the various sense modalities |  |  |  |  |  |  |  |  |
| Obj 7 | At the end of the session Phase 1 student must be able to classify the sensations. |  |  |  |  |  |  |  |  |
| Obj 8  | At the end of the session Phase 1 student must be able to reproduce the concept of receptors |  |  |  |  |  |  |  |  |
| Obj 9 | At the end of the session Phase 1 student must be able to classify the receptors |  |  |  |  |  |  |  |  |
| Obj 10 | At the end of the session Phase 1 student must be able to explain the functioning of receptors and genesis of receptor potential. |  |  |  |  |  |  |  |  |
| Obj 11 | At the end of the session Phase 1 student must be able to discuss the properties of receptors  |  |  |  |  |  |  |  |  |
| Obj 12 | At the end of the session Phase 1 student must be able to reproduce the concept of reflexes. |  |  |  |  |  |  |  |  |
| Obj 13 | At the end of the session Phase 1 student must be able to classify the reflexes |  |  |  |  |  |  |  |  |
| Obj 14 | At the end of the session Phase 1 student must be able to discuss the properties of reflexes |  |  |  |  |  |  |  |  |
| **PY 10.3** | **Describe and discuss the Somatic sensations and sensory tracts.** | K | KH | Y | Lecture , Small group discussion  | Written / Viva voce |  |  | Human Anatomy |
| Obj 1. | At the end of the session Phase 1 student must be able to Describe the functional anatomy of spinal cord. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to enumerate the various sensory tracts and sensory nucleus of spinal cord. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to reproduce the formation, course and termination of various sensory tracts. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to reproduce the sensations carried by each tract. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to discuss the signs and symptoms produced due to lesion of each tract |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to discuss the role of thalamus and sensory cortex in sensory processing. |  |  |  |  |  |  |  |  |
| **PY 10.4**  | **Describe and discuss motor tracts ,mechanisms of maintenance of Tone, control of body movements, posture and equilibrium and vestibular apparatus** | **K** | **KH** | **Y** | **Lecture , Small group discussion**  | **Written /Viva voce**  |  |  | **Human Anatomy** |
| Obj 1. | At the end of the session Phase 1 student must be able to understand the general organization of the motor system. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to list the motor areas and describe their functions with applied physiology |  |  |  |  |  |  |  |  |
| Obj 3.  | At the end of the session Phase 1 student must be able to list the Descending motor tracts  |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to trace the Corticospinal /Pyramidal tract from origin to termination. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to enumerate the Extrapyramidal tracts. |  |  |  |  |  |  |  |  |
| Obj 6.  | At the end of the session Phase 1 student must be able to define upper and lower motor neurons and with UMN and LMN lesions. |  |  |  |  |  |  |  |  |
| Obj 7.  | At the end of the session Phase 1 student must be able to describe the structure and function of muscle spindle with its innervation. |  |  |  |  |  |  |  |  |
| Obj 8.  | At the end of the session Phase 1 student must be able to describe the role of muscle spindle during muscle activity. |  |  |  |  |  |  |  |  |
| Obj 9.  | At the end of the session Phase 1 student must be able to describe the structure and function of golgi tendon with its innervation. |  |  |  |  |  |  |  |  |
| Obj 10. | At the end of the session Phase 1 student must be able to explain the role of gamma motor neuron in control of muscle tone. |  |  |  |  |  |  |  |  |
| Obj 11. | At the end of the session Phase 1 student must be able to describe the stretch reflex and enlist the components of reflex arc. |  |  |  |  |  |  |  |  |
| Obj 12 . | At the end of the session Phase 1 student must be able to to describe the regulation of stretch reflex  |  |  |  |  |  |  |  |  |
| Obj 13 . | At the end of the session Phase 1 student must be able to describe structure and functions of Vestibular Apparatus in maintanence of equilibrium. |  |  |  |  |  |  |  |  |
| Obj 14. | At the end of the session Phase 1 student must be able to describe the various tests to assess the Vestibular functions. |  |  |  |  |  |  |  |  |
| Obj 15. | At the end of the session Phase 1 student must be able to define Nystagmus and vestibular mechanisms for stabilizing the eyes(Vestibular ocular Reflex). |  |  |  |  |  |  |  |  |
| Obj 16. | At the end of the session Phase 1 student must be able to list and describe various Postural reflexes  |  |  |  |  |  |  |  |  |
| Obj 17. | At the end of the session Phase 1 student must be able to discuss difference between Classical Sherrington Decrebrate rigidity and ischemic decerebrate rigidity. |  |  |  |  |  |  |  |  |
| **PY 10.5** | **Describe and discuss the structure and function of reticular activating system, autonomic nervous system** | **K** | **KH** | **Y** | **Lecture , Small group** **Discussion**  | **Written / Viva voce**  |  |  | **Human Anatomy** |
| Obj 1.  | At the end of the session Phase 1 student must be able to Discuss the components of reticular activating system. |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of the session Phase 1 student must be able to Describe the connections of reticular activating system. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to discuss the functions and clinical application of reticular activating system. |  |  |  |  |  |  |  |  |
| Obj 4.  | At the end of the session Phase 1 student must be able to Describe the components and organisation of autonomic nervous system. |  |  |  |  |  |  |  |  |
| Obj 5.  | At the end of the session Phase 1 student must be able to enumerate the functions of sympathetic and parasympathetic nervous system. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to discuss the role of higher autonomic centres |  |  |  |  |  |  |  |  |
| Obj 7.  | At the end of the session Phase 1 student must be able to Describe the types of autonomic receptors and effect of stimulation of sympathetic and parasympathetic nerve supply of various organs of body |  |  |  |  |  |  |  |  |
| Obj 8.  | At the end of the session Phase 1 student must be able to define basal tone of sympathetic and parasympathetic components and explain their importance.  |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session Phase 1 student must be able to discuss the physiological basis of abnormalities of autonomic nervous system. |  |  |  |  |  |  |  |  |
| **PY 10.6**  | **Describe and discuss Spinal cord, its function, lesions and sensory disturbances** | **K** | **KH** | **Y** | **Lecture , Small group discussion**  | **Written / Viva voce** |  |  | **Human Anatomy**  |
| Obj 1. | At the end of the session Phase 1 student must be able to enumerate the functions of Spinal cord |  |  |  |  |  |  |  |  |
| Obj 2.  | At the end of the session Phase 1 student must be able to discuss the lesions of Spinal cord and the sensory, motor and autonomic disturbances caused by them |  |  |  |  |  |  |  |  |
| **PY 10.7** | **Describe and discuss functions of cerebral cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system and their abnormalities.** | **K** | **KH** | **Y** | **Lecture ,Small group discussion** | **Written / viva voce**  |  | **Psychiatry**  | **Human Anatomy**  |
| Obj 1. | At the end of the session Phase 1 student must be able to enumerate various cortical areas and their functions  |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to discuss the effect of lesions of various cortical areas |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Enumerate the various components of the basal ganglia |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to describe the connections of the basal ganglia |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to discuss the various functions of the basal ganglia |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to discuss the clinical abnormalities of the basal ganglia including Parkinsonism. |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session Phase 1 student must be able to enumerate the various nuclei of the thalamus |  |  |  |  |  |  |  |  |
| Obj 8.  | At the end of the session Phase 1 student must be able to describe the connections of the thalamus |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session Phase 1 student must be able to discuss the various functions of the thalamus |  |  |  |  |  |  |  |  |
| Obj 10.  | At the end of the session Phase 1 student must be able to discuss the clinical abnormalities of the thalamus |  |  |  |  |  |  |  |  |
| Obj 11. | At the end of the session Phase 1 student must be able to enumerate the various nuclei of the hypothalamus |  |  |  |  |  |  |  |  |
| Obj 12. | At the end of the session Phase 1 student must be able to describe the connections of the hypothalamus |  |  |  |  |  |  |  |  |
| Obj 13. | At the end of the session Phase 1 student must be able to discuss the various functions of the hypothalamus |  |  |  |  |  |  |  |  |
| Obj 14. | At the end of the session Phase 1 student must be able to Enumerate the anatomical, functional and phylogenetic divisions of the cerebellum.  |  |  |  |  |  |  |  |  |
| Obj 15. | At the end of the session Phase 1 student must be able to enumerate the various nuclei of the cerebellum |  |  |  |  |  |  |  |  |
| Obj 16. | At the end of the session Phase 1 student must be able to describe the internal circuitry of the cerebellum |  |  |  |  |  |  |  |  |
| Obj 17. | At the end of the session Phase 1 student must be able to Describe the connections of cerebellum |  |  |  |  |  |  |  |  |
| Obj 18. | At the end of the session Phase 1 student must be able to discuss the various functions of the cerebellum |  |  |  |  |  |  |  |  |
| Obj 19 . | At the end of the session Phase 1 student must be able to discuss the various clinical abnormalities of the cerebellum. |  |  |  |  |  |  |  |  |
| Obj 20.  | At the end of the session Phase 1 student must be able to enumerate the various components of the limbic system. |  |  |  |  |  |  |  |  |
| Obj 21. | At the end of the session Phase 1 student must be able to describe the components and functioning of the Papez circuit. |  |  |  |  |  |  |  |  |
| Obj 22. | At the end of the session Phase 1 student must be able to discuss the various functions of the limbic system |  |  |  |  |  |  |  |  |
| Obj 23. | At the end of the session Phase 1 student must be able to Discuss the clinical abnormalities of the limbic system including addictions. |  |  |  |  |  |  |  |  |
| PY 10.8 | **Describe and discuss behavioural and EEG characteristics during sleep and mechanism responsible for its production.** | K | KH | Y | Lecture , small group discussion | Written / viva voce |  | Psychiatry  |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Discuss the mechanism of genesis of EEG waves. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Enumerate different types of EEG waves |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Reproduce the characteristics and importance of different waves of EEG. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Describe the types of sleep and their characteristic features. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Describe the stages of sleep and their characteristic features. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to Draw the EEG waves in different stages of sleep |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session Phase 1 student must be able to Differentiate between NREM and REM sleep  |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session Phase 1 student must be able to Describe mechanisms for production of sleep |  |  |  |  |  |  |  |  |
| Obj 9.  | At the end of the session Phase 1 student must be able to Discuss the various sleep disorders |  |  |  |  |  |  |  |  |
| **PY 10.9**  | **Discuss the physiological basis of memory, learning and speech** | **K** | **KH** | **Y** | **Lecture , Small group discussion**  | **Written / viva voce**  |  | **Psychiatry**  |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Define and classify the learning and memory |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Explain the types and significance of conditioned reflexes. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Describe the mechanism of learning and memory |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Comment on the brain areas involved in the different types of learning and memory. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Describe the physiological basis of abnormalities of learning and memory. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to Enumerate the areas of the brain involved in speech |  |  |  |  |  |  |  |  |
| Obj 7.  | At the end of the session Phase 1 student must be able to Describe the physiological basis of abnormalities of speech. |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session Phase 1 student must be able to Describe the different types of aphasia |  |  |  |  |  |  |  |  |
| **PY 10.10**  | **Describe and discuss chemical transmission in the nervous system (Outline the psychiatry element)** | K | KH | Y | Lecture , Small group discussion | Written/viva voce |  |  |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Classify the different types of neurotransmitters in the nervous system. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Describe the main sites of release of different types of neurotransmitters in CNS |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Discuss the mechanism of action of excitatory and inhibitory neurotransmitters.  |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Describe the physiological basis of various psychiatric disorders. |  |  |  |  |  |  |  |  |
| **PY10.11** | **Demonstrate the correct clinical examination of the nervous system: higher functions, sensory system, motor system, reflexes and cranial nerves in a normal volunteer or simulated environment.** | **S** | **P** | **Y** | **DOAP sessions** | **Skill assessment / vivavoce /OSCE** | **1 each ( total 5 )** |  | Human Anatomy  |
| Obj 1. | At the end of the session Phase 1 student must be able to Perform the clinical examination of higher functions on a normal volunteer |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Perform the clinical examination of sensory system on a normal volunteer. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Perform the clinical examination of motor system on a normal volunteer. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Perform the clinical examination of reflexes (superficial and deep) on a normal volunteer |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Perform the clinical examination of cranial nerves on a normal volunteer. |  |  |  |  |  |  |  |  |
| **PY10.12** | **Identify normal EEG forms** | **S** | **S** | **Y** | **Small group teaching**  | **OSPE/Viva voce**  |  | **Psychiatry**  |  |
| Obj 1.  |  At the end of the session Phase 1 student must be able to Identify EEG waves in an EEG recorded from a normal volunteer. |  |  |  |  |  |  |  |  |
| **PY10.13** | **Describe and discuss perception of smell and taste sensation.** | **K** | **KH** | **Y** | **Lecture ,Small group teaching**  | **Written /Viva voce**  |  | **ENT**  |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Draw the structure of olfactory receptor cell and olfactory pathway. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Describe the mechanism of olfaction |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Draw the structure of taste bud and taste pathway |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Obj 4.  | At the end of the session Phase 1 student must be able to Describe the mechanism of gustatory transduction |  |  |  |  |  |  |  |  |
| **PY10.14** | **Describe and discuss pathophysiology of altered smell and taste sensation.** | **K** | **KH** | **Y** | **Lecture , small group discussion**  | **Written / viva voce**  |  | **ENT** |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Discuss the physiological basis of abnormalities of olfaction. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Discuss the physiological basis of various taste disorders. |  |  |  |  |  |  |  |  |
| **PY10.15** | **Describe and discuss the functional anatomy of ear and auditory pathways and physiology of hearing.** | **K** | **KH** | **Y** | **Lecture , small group discussion**  | **Written/ viva voce**  |  | **ENT** |  |
| Obj 1.  | At the end of the session Phase 1 student must be able to Discuss the physical principles of sound |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Enumerate the parts of the ear and tell the functions of each part. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Discuss the functions of middle ear. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Draw the structure of organ of corti |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Discuss the transduction in hair cells. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to Describe the various theories of hearing  |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session Phase 1 student must be able to Describe the auditory pathways. |  |  |  |  |  |  |  |  |
| **PY10.16**  | **Describe and discuss pathophysiology of deafness. Describe hearing tests.** | **K** | **KH** | **Y** | **Lecture , small group discussions** | **Written/ viva voce**  |  | **ENT** |  |
| Obj 1.  | At the end of the session Phase 1 student must be able to Describe the types of deafness and their physiological basis. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Discuss the various tests for hearing. |  |  |  |  |  |  |  |  |
| PY10.17  | **Describe and discuss the functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, colour blindness, physiology of pupil and light reflexes.** | **K** | **KH** | **Y** | **Lecture, small group discussion** | **Written /viva voce**  |  | **Ophthalmology** |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Enumerate the various parts of eyeball and functions of each part. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Enumerate the layers of retina and their functions. |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Discuss the role of choroid, ciliary body, and iris in visual function. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Comment on the importance of fovea centralis, fundus and optic disc. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Discuss the normal intraocular pressure and consequences of raised intraocular pressure. |  |  |  |  |  |  |  |  |
| Obj 6. | At the end of the session Phase 1 student must be able to Reproduce the principles of optics. |  |  |  |  |  |  |  |  |
| Obj 7. | At the end of the session Phase 1 student must be able to Describe the various physical principles of refraction of light rays by the cornea and lens. |  |  |  |  |  |  |  |  |
| Obj 8. | At the end of the session Phase 1 student must be able to Describe the physiological basis of errors of refraction. |  |  |  |  |  |  |  |  |
| Obj 9. | At the end of the session Phase 1 student must be able to Describe the physiological basis of errors of refraction. |  |  |  |  |  |  |  |  |
| Obj 10. | At the end of the session Phase 1 student must be able to Discuss the mechanism of accommodation. |  |  |  |  |  |  |  |  |
| Obj 11. | At the end of the session Phase 1 student must be able to Draw the pathway of accommodation reflex. |  |  |  |  |  |  |  |  |
| Obj 12. | At the end of the session Phase 1 student must be able to Describe the pathway of pupil and light reflex and their significance. |  |  |  |  |  |  |  |  |
| Obj 13. | At the end of the session Phase 1 student must be able to Enumerate the anatomical and physiological differences between rods and cones.  |  |  |  |  |  |  |  |  |
| Obj 14.  | At the end of the session Phase 1 student must be able to Describe the various visual pigments and their role in vision. |  |  |  |  |  |  |  |  |
| Obj 15. | At the end of the session Phase 1 student must be able to Discuss the mechanism of transduction of photoreceptors. |  |  |  |  |  |  |  |  |
| Obj 16.  | At the end of the session Phase 1 student must be able to Describe the importance of photoreceptor potential. |  |  |  |  |  |  |  |  |
| Obj 17. | At the end of the session Phase 1 student must be able to Draw a schematic diagram of visual pathway. |  |  |  |  |  |  |  |  |
| Obj 18. | At the end of the session Phase 1 student must be able to Enumerate the visual cortical areas and their functions. |  |  |  |  |  |  |  |  |
| Obj 19.  | At the end of the session Phase 1 student must be able to Describe the processing of visual signals |  |  |  |  |  |  |  |  |
| Obj 20.  | At the end of the session Phase 1 student must be able to Describe the physiology of colour vision |  |  |  |  |  |  |  |  |
| Obj 21.  | At the end of the session Phase 1 student must be able to Discuss the physiological basis of colour vision defects. |  |  |  |  |  |  |  |  |
| PY10.18  | **Describe and discuss the physiological basis of lesion in visual pathway** | **K** | **KH**  | **Y** | **Lecture, small group discussion** | **Written /viva voce** |  | **Ophthalmology**  |  |
| Obj 1. | At the end of the session Phase 1 student must be able to explain the physiological basis of lesions in different parts of visual pathway and there effects on visual field. |  |  |  |  |  |  |  |  |
| **PY10.19** | **Describe and discuss auditory and visual evoked potentials.** | **K** | **KH** | **Y** | **Lecture , small group discussion**  | **Written /viva voce** |  | **ophthalmology** |  |
| Obj 1. | At the end of the session Phase 1 student must be able to Reproduce the concept of evoked potential. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Comment on the types of evoked potentials. |  |  |  |  |  |  |  |  |
| Obj 3.  | At the end of the session Phase 1 student must be able to Discuss the mechanism of auditory evoked potentials. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Discuss the mechanism of visual evoked potentials. |  |  |  |  |  |  |  |  |
| Obj 5.  | At the end of the session Phase 1 student must be able to Describe the principle of recording the auditory and visual evoked potentials |  |  |  |  |  |  |  |  |
| Obj 6.  | At the end of the session Phase 1 student must be able to Describe the clinical significance of recording the auditory and visual evoked potentials. |  |  |  |  |  |  |  |  |
| **PY10.20** | **Demonstrate (i) Testing of visual acuity, colour and field of vision and** **(ii) Testing for smell and** **(iv) taste sensation in volunteers.** | **S** | **P** | **Y** | **DOAP sessions** | **Skill assessment /viva voce**  | **1 each** **( total 4)** | **ENT , Ophthalmology** |  |
| Obj 1.  | At the end of the session Phase 1 student must be able to Test the visual acuity of a normal subject by using Snellen’s chart and Jaegger’s chart. |  |  |  |  |  |  |  |  |
| Obj 2. | At the end of the session Phase 1 student must be able to Test the colour vision of a normal subject by using Ishihara charts |  |  |  |  |  |  |  |  |
| Obj 3. | At the end of the session Phase 1 student must be able to Test the field of vision and demarcate the physiological blind spot of a normal subject by using perimeter. |  |  |  |  |  |  |  |  |
| Obj 4. | At the end of the session Phase 1 student must be able to Perform the testing of sense of smell of a normal subject and discuss the abnormalities associated with sense of smell. |  |  |  |  |  |  |  |  |
| Obj 5. | At the end of the session Phase 1 student must be able to Perform the testing of sense of taste of a normal subject and discuss the physiological basis of abnormalities associated with sense of taste. |  |  |  |  |  |  |  |  |
| **TOPIC: INTEGRATED PHYSIOLOGY NUMBER OF COMPETENCIES : 14** |
| **No** | **Competency** | **Domain****K/S/A/C** | **Level****K/KH/****SH/P** | **Core****Y/N** | **Suggested Teaching/** **Learning Method** | **Suggested Assessment Method** | **Number required to Certify** | **Vertical****Integration** | **Horizontal Integration**  |
| **PY 11.1** | **Describe and discuss Mechanism of Temperature Regulation** | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Normal Body Temperature and Factors affecting it |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand role of Thermoreceptors in Regulation of Body Temperature |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand role of Hypothalamusas a Thermostat in Regulation of Body Temperature |  |  |  |  |  |  |  |  |
| **PY****11.2** | **Describe and discuss Adaptation to Altered Temperature (Heat and Cold)** | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Role of Thermoregulatory Effector Mechanisms |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand Mechanisms activated by Heat  |  |  |  |  |  |  |  |  |
| OBJ3 | At the end of session, Phase I students must be able to understand Mechanisms activated by Cold  |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to understand Concept of Set Point for Temperature Control |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to understand Behavioural control of Body Temperature |  |  |  |  |  |  |  |  |
| **PY 11.3** | **Describe and Discuss Mechanisms of Fever, Cold Injuries, Heat Stroke** | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Fever, its Etiology and its Effects on body |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to describe Malignant Hyperthermia, Heat Exhaustion and Heat Stroke |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to describe Hypothermia and Cold injuries |  |  |  |  |  |  |  |  |
| **PY 11.4** | **Describe and Discuss Cardio Respiratory and Metabolic adjustments during Exercise, Physical Training Effects** | **K** | **KH** | **Y** | **Lecture, Small Group****Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to describe Types of Exercise |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to explain various Respiratory Adjustments during different types of Exercise |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand concept of Oxygen Uptake during exercise including VO2 max |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to understand Cardiovascular changes during Exercise  |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to explain increase in Skeletal Muscle Blood Flow and Redistribution of Blood flow during Exercise |  |  |  |  |  |  |  |  |
| OBJ 6 | At the end of session, Phase I students must be able to describe Metabolic changes during Exercise |  |  |  |  |  |  |  |  |
| OBJ 7 | At the end of session, Phase I students must be able to discuss Physiological Effects of Physical Training (Endurance and Resistance training)  |  |  |  |  |  |  |  |  |
| OBJ 8 | At the end of session, Phase I students must be able to describe Advantages of Physical Training |  |  |  |  |  |  |  |  |
| **PY 11.5** | **Describe and discuss Physiological Consequences of Sedentary Lifestyle**  | **K** | **KH** | **Y** | **Lecture, Small Group****Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to explain Physiological effects of Sedentary life Style |  |  |  |  |  |  |  |  |
| OBJ2 | At the end of session, Phase I students must be able to describe different types of Non communicable Diseases (Obesity , Diabetes, Hypertension , Cardiovascular diseases ) attributable to Sedentary lifestyle |  |  |  |  |  |  |  |  |
| OBJ3 | At the end of session, Phase I students must be able to correlate the need and mode of Prevention of these diseases. |  |  |  |  |  |  |  |  |
| OBJ4 | At the end of session, Phase I students must be able to understand Physiological basis of Management of these diseases  |  |  |  |  |  |  |  |  |
| **PY****11.6** | **Physiology of Infancy**  | **K** | **KH** | **Y** | **Lecture, Small Group****Discussion** | **Written /Viva-voce** |  | **Paediatrics** |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand different Periods of Growth of the Child during Infancy  |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand Respiratory, Circulatory and Metabolic Adjustments at time of Birth  |  |  |  |  |  |  |  |  |
| OBJ 3 |  At the end of session, Phase I students must be able to enumerate Key Mile Stones of Gross Motor Development, Fine Motor and Adaptive Development |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to describe Signs of Developmental delays |  |  |  |  |  |  |  |  |
| **PY 11.7** | **Describe and discuss Physiology of Aging , Free Radicals and Antioxidants** | **K** | **KH** | **Y** | **Lecture,****Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Theories of Aging  |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to describe Physiological changes with Aging |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand Mechanism of Tissue Injury by Free Radicals  |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to understand Factors and Physiological processes that Delay and Prevent Aging  |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to understand Importance of Antioxidant Nutrients  |  |  |  |  |  |  |  |  |
| **PY 11.8** |  **Discuss and Compare Cardio Respiratory changes in Exercise (Isometric and Isotonic) with that in the Resting State and under different Environmental conditions**  | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Cardiovascular changes during Isometric and Isotonic Exercise  |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand Respiratory changes during Isometric and Isotonic Exercise |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to Compare Cardio-Respiratory changes in Isometric and Isotonic Exercise |  |  |  |  |  |  |  |  |
| **PY 11.9** | **Interpret Growth Charts** | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  | **Paediatrics** |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Different Patterns of Growth including General Growth , Neural Growth , Gonadal and Lymphoid Growth  |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to Interpret Growth Chart:  Weight for Age Growth Chart Stature for Age Growth Charts, Body mass Index for Age Charts for : Boys and Girls separately and their Percentiles  |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand the Factors that Regulate Growth  |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to understand Physiological basis of Developmental deficiencies |  |  |  |  |  |  |  |  |
| **PY****11.10** | **Interpret Anthropometric Assessment of Infants**  | **K** | **KH** | **Y** | **Lecture, Small Group Discussion** | **Written /Viva-voce** |  | **Paediatrics** |  |
| OBJ 1 | At the end of session, Phase I students must know how to undertake Anthropometric Parameters / Body Measurements of Infants |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must know the Standard Reference values related to Individual Parameters |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must know the importance of Anthropometric Assessment along with Growth Charts in Evaluating Nutritional Status of Infants |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students should be familiar with common Nutritional Abnormalities and the Means of preventing these Deficiencies  |  |  |  |  |  |  |  |  |
| **PY 11.11** | **Discuss The Concept, Criteria For The Brain Death And Its Implication**  | **K** | **KH** | **Y** | **Lecture****Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Concept and meaning of Brain Death. |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand various Signs of Brain Death. |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must know how to undertake complete Neurological Assessment for diagnosis of Brain Death  |  |  |  |  |  |  |  |  |
| OBJ4 | At the end of session, Phase I students should know the Confirmatory tests of Brain Death |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students should understand the Responsibility as the attending Physician to Notify and Counsel the next of kin. |  |  |  |  |  |  |  |  |
| OBJ 6 | At the end of session, Phase I students must be sound of the Medico legal implications of the same |  |  |  |  |  |  |  |  |
| **PY 11.12** | **Physiological effects of Meditation**  | **K** | **KH** | **Y** | **Lecture,** **Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to understand Concept and meaning of Meditation  |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to understand Common Physiological Features in Different Meditation Techniques  |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand Physiological effects of Meditation on Respiratory , CVS , CNS(especially ANS) and Endocrine Systems  |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must know how to assess the Effects of Meditation on various systems |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to understand Importance of Meditation as Prevention and Treatment of Certain Diseases like Hypertension , Diabetes , Bronchial asthma , Coronary Heart disease and Psychological disorders  |  |  |  |  |  |  |  |  |
| **PY 11.13** | **Obtain history and perform General Physical Examination in the volunteer/simulated environment** | **K** | **KH** | **Y** | **Lecture,****Small Group Discussion** | **Written /Viva-voce** |  |  |  |
| OBJ 1 | At the end of session, Phase I students must be able to note down Chief Complaints in his/ her own words |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students must be able to obtain History of Present illness, Personal, Family and Socio-economic History |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to obtain Past History of any Medical or Surgical illness |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to carry out General Physical Examination |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to record the Vital Signs |  |  |  |  |  |  |  |  |
| OBJ 6 | At the end of session, Phase I students must be able to observe the Nutritional status of the Patient  |  |  |  |  |  |  |  |  |
| OBJ 7 | At the end of session, Phase I students must be able to observe Abnormal Signs ( Pallor, Icterus, Cyanosis, Edema, Lymphadenopathy and Clubbing ) |  |  |  |  |  |  |  |  |
| **PY****11.14** | **Demonstrate Basic Life Support in a Simulated Environment** T | **K** | **KH** | **Y** | **Lecture****Small Group Discussion** | **Written /Viva-voce** |  | **General Medicine /****Anaesthesiology** |  |
| OBJ1 | At the end of session, Phase I students must have knowledge about Medical Emergencies and their Consequences |  |  |  |  |  |  |  |  |
| OBJ 2 | At the end of session, Phase I students should have Basic Knowledge of Emergency care and Skills necessary for dealing with these situations  |  |  |  |  |  |  |  |  |
| OBJ 3 | At the end of session, Phase I students must be able to understand the Techniques and Steps of BLS |  |  |  |  |  |  |  |  |
| OBJ 4 | At the end of session, Phase I students must be able to understand the importance of Time and Duration of continuing BLS Protocols  |  |  |  |  |  |  |  |  |
| OBJ 5 | At the end of session, Phase I students must be able to understand the importance of Simulation Training in BLS courses |  |  |  |  |  |  |  |  |