

# Vidyasagar University

## Curriculum for B. Sc (General) in Physiology

### [Choice Based Credit System]

#### Semester-II

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
<b>CC4</b> <b>[DSC-1B]</b>		Blood, body fluid and immune System, Cardiovascular System and Respiratory System.	Core Course	4	0	0	6	75
		<b>Practical</b>		0	0	4		
<b>CC5</b> <b>[DSC-2B]</b>	TBD	<b>DSC-2B (other Discipline)</b>	Core Course				6	75
<b>CC6</b> <b>[DSC-3B]</b>	TBD	<b>DSC-3B (other Discipline)</b>	Core Course				6	75
<b>AECC</b>		<b>Environmental Studies</b>	AECC (Elective)				4	100
<b>Semester Total</b>							<b>22</b>	<b>325</b>

**L**=Lecture, **T**=Tutorial, **P**=Practical, **CC** = Core Course, **TBD** = To be decided, **AECC**= Ability Enhancement Compulsory Course. **DSC-1** = Discipline Specific Core of Subject-1, **DSC-2** = Discipline Specific Core of Subject-2, **DSC-3** = Discipline Specific Core of Subject-3.

**Semester-II**  
**Core Course (CC)**

**DSC-1B: Blood, body fluid and immune System, Cardiovascular System and Respiratory System**

**Credits 06**

**DSC1BT: Blood, body fluid and immune System, Cardiovascular System and Respiratory System**

**Credits 04**

**Course Contents:**

**Blood & Body fluids:**

**Blood :** Properties of blood, Composition, character, properties and function of blood. Plasma proteins: origin, separation and functions. Plasmapheresis. Bone marrow. Formed elements of blood. Erythrocytes :Morphology, fate and functions. Fragility of RBC. Erythropoiesis: Definition, steps of erythropoiesis, role of different factors on erythropoiesis. Haemoglobin: chemistry, biosynthesis, functions, catabolism, derivatives. Abnormal haemoglobin. Anaemia: different types, Clinical significances. Leucopoiesis. Leucocytes : staining, types and morphology, life cycles and functions. Colony Stimulating factor , Phagocytosis, Inflammation. Significances of leucocytosis and leucocytopenia. Leukaemia. Arneht counts. Schilling Index, Reticulocyte counts. Platelets: Structure, functions. Platelets reaction, Critical counts of Platelets. Significance of platelets counts. Thrombocytosis, Thrombocytopenia. Coagulation of blood: Mechanism of blood coagulation, factors affecting blood coagulations, Pro-coagulants, anticoagulants, disorder of coagulation. Fibrinolytic systems. Bleeding disorders, tests for bleeding disorders. Thrombotic disorders. Coagulation time, bleeding time, prothrombin time, hemolysis.

Blood groups - The ABO systems, The Rh systems, The MN system, Importance of blood groups, Immunological basis of identification of ABO and Rh blood groups. Cross matching, Donor and Recipient. Blood transfusion – collection and storage of bloods, Blood products, Preservation injuries, Precaution and hazards of blood transfusions. The RH system and pregnancy, Erythroblastosis foetalis. Blood volume: Normal value. Determination of blood volume. Determination of cell volume, Determination of plasma volume, variation and maintenance of blood volume. effective blood volume, factors influencing blood volume, regulation of blood volume.

**Body fluids:** Intracellular and extra cellular compartment of body fluids. Water : intake and excretion. Volumes of body water in different compartments and their estimation. Water balance and its regulation. Dehydration and oedema. Lymph and tissue fluids: Composition, formation, circulation , function and fate of lymph and tissue fluids.

## **Immune System**

Immune system: Overview, properties of immune system, types of immunity : innate immunity, acquired immunity, active and passive immunity. First and second line defence. Humoral and Cell mediated immunity. Complement system. Immune Competent cells : structure and functions of neutrophil, B lymphocytes, T- lymphocytes ( helper, cytotoxic and suppressor), Natural killer cells, monocytes – macrophages. Primary and Secondary lymphoid organs.

Antigen and Antibody : Properties of immunogen, antigens and haptens. Classification, structure and functions of immunoglobulins. Antigen- antibody reaction, physiological effects and clinical significances. Major Histocompatibility Complex.. Brief idea of auto immunity. AIDS. Transplantation immunity.

Vaccination : Immunization- Passive and active immunization. Immunizing agents. Vaccine. Antisera. Vaccination. Toxin and Toxoids.

## **Cardiovascular system:**

Cardiovascular system - Anatomy and histology of the heart. Properties of cardiac muscle. Origin and propagation of cardiac impulse. Electrophysiology of cardiac tissue. Heart Block , basic idea about artificial pacemaker. Cardiac valves, Heart rate and its regulations. Heart sounds. Nerves and its role in the regulation of the heart function. Frank – Starling's law of heart. Electrocardiography, Echocardiography,

Cardiac cycle : events. different phases and pressure changes in cardiac chamber, factors affecting and regulation. Cardiac output: methods of determination (dye dilution and Fick principle), factors affecting regulation.

Structure of arteries, arterioles, capillaries. Venules and veins. Pulse - arterial and venous. Blood pressure and its regulation and factors controlling. Baro - and Chemoreceptor. Vasomotor reflexes. Methods of measurement of blood pressure. Role of Renin- angiotensin system, Vasopressin or ADH in Blood Pressure regulations.

Peculiarities of regional circulations: Coronary, Pulmonary, Renal, Cutaneous, Hepatic and Cerebral.

## **Respiratory System:**

Anatomy and histology of the respiratory passage and organs. Role of respiratory muscles in breathing. Compliance & elastic recoil of the lung, Lung surfactant, intra thoracic and intra pleural pressure. Respiratory failure. Artificial respiration. Significance of physiological and anatomical dead space. Lung volumes and capacities. Exchange of respiratory gases between lung and blood and between blood and

tissues. Transport of oxygen and carbon dioxide in blood. Regulation of respiration - neural and chemical. Role of respiratory centre, central and peripheral chemo-receptors. Hypoxia, asphyxia, dyspnea, asthma, cyanosis, dysbarism,. Lung function tests. Non respiratory function of lungs.

## **DSC1BP: Practical**

**Credits 02**

### **Haematology:**

1. Study of the compound microscope.
2. Preparation of blood film of your own blood. Staining of the blood film with Leishman's stain. Identification of different types of blood corpuscles.
3. Determination of TC of RBC and WBC by haemocytometer.
4. Differential count of WBC.
5. Determination of ESR of human blood.
6. Estimation of haemoglobin by haemoglobinometer.
7. Preparation of haemin crystals.
8. Determination of Blood groups.
9. Determination of clotting time, bleeding time, prothrombin time.
10. Determination of osmotic fragility of Red Blood Corpuscle.
11. Preparation and staining of bone marrow. Measurement of diameter of megakaryocyte.
12. Reticulocyte staining

### **Human Experiment:**

1. Measurement of arterial blood pressure by Sphygmomanometer at rest and after exercise, Calculate the mean arterial blood pressure (MABP)
2. Measurement of heart rate and pulse rate (30 beats methods) during rest and exercise and graphical plotting.
3. Modified Harvard step test and determination of physical fitness.
4. Pneumographic recording of respiratory movements along with the effect of drinking of water, talking, laughing, coughing, exercise, hyperventilation and breathe holding.
5. **Demonstration:** Measurement of oxygen saturation by pulse oxymeter before and after exercise. Measurement of Peak Expiratory Flow Rate. Measurement of forced expiratory volume (FEV) in first second.