

PHYSIOLOGY:

Introduction:

Human physiology is the science of the mechanical, physical, and biochemical functions of humans in good health, their organs, and the cells of which they are composed. Physiology focuses principally at the level of organs and systems. Most aspects of human physiology are closely homologous to corresponding aspects of animal physiology, and animal experimentation has provided much of the foundation of physiological knowledge. Anatomy and physiology are closely related fields of study: anatomy, the study of form, and physiology, the study of function, are intrinsically tied and are studied in tandem as part of a medical curriculum.

Course Description: the course includes the detailed teaching of physiology of human cell and transport mechanisms, nerve and muscle, cardiovascular system, central nervous system, respiratory system, gastrointestinal tract, renal physiology and endocrinology.

Learning experience: The course is run throughout the academic year

Learning Resources

Recommended Textbooks:

- Textbook of Medical physiology 12th edition 2010 Guyton. Saunders.

Reference list:

- Review of Medical Physiology 23rd edition 2010 Ganong. Appleton & Lange.
- Physiology 2nd Revised edition 1998 Linda S Costanzo. W B Saunders.
- Lecture Notes on human physiology 4th edition Bray JJ, Cragg PA, MacKnight ADC, Mills R G & Taylor DW. Blackwell.
- Human physiology 8th edition 1998 Vander, Sherman & Luciano. McGraw Hill.
- Berne & Levy Physiology 6th edition 2010

Physiology Course

Course Description / Objectives	Suggested Lecture Hours
CELL PHYSIOLOGY	2
Draw and label the structure and explain the function of the following: cell membrane; cell organelles; nucleus.	
Explain the following processes related to the functional system of the cell: transcription & translation of DNA, pinocytosis, endocytosis, phagocytosis, exocytosis & locomotion.	
NERVE & MUSCLE	3
Explain the following processes: Transport of ions & molecules; diffusion; active transport.	
Explain the establishment of resting membrane	

potential and the generation of action potential. Explain the mechanism of nerve impulse conduction . Relate to local anesthesia mechanism of action and failure.	
Draw and label the physiological anatomy of skeletal and smooth muscle . Name the function of each structure labelled. Explain mechanisms of muscle contraction Explain Neuromuscular transmission and relate to Myasthenia gravis.	
CARDIOVASCULAR SYSTEM	12
Draw, and label the physiological anatomy of the cardiac muscle and the conducting system of the heart. Name the function of each labelled structure.	
Explain the generation and conduction of cardiac impulse .	
Explain the events of the cardiac cycle . Explain how normal heart sounds are produced. Interpret normal ECG	
Apply physical principles (pressure, flow and resistance, viscosity) to human circulation	
Explain microcirculation & lymphatic system Explain the vasodilator theory and the oxygen lack theory of local control of blood flow . Name factors regulating peripheral vascular resistance .	
Explain short term & long term arterial pressure regulation and relate to hypertension.	
Name the factors regulating venous return . Define cardiac output , name the regulating factors.	
Outline the cardiac output measurement methods (oxygen Fick principle, dye dilution method). Relate to insufficiency of circulation.	
Define circulatory shock , name the stages and types of shock. Outline the physiology each type of shock.	
RESPIRATION	5
Outline the basic organization of respiratory system. Explain the mechanics of pulmonary ventilation .	
Relate pulmonary volumes & capacities to clinical diagnosis of obstructive and restrictive lung disease.	
Differentiate between anatomical & physiological dead space .	

Outline principles of gas exchange & transport in blood Explain nervous & chemical regulation of respiration.	
Define Hypoxia . Outline its causes, types & effects. Define Cyanosis . Outline its causes, types & effect	
BLOOD PHYSIOLOGY	9
Explain red blood cell production, functions & regulation (erythropoiesis). Describe the structure of Hemoglobin & explain iron metabolism. Explain production & functions of Leukocytes.	
Classify anemia's & polycythemia . Outline the pathophysiology of iron deficiency anemia, megaloblastic anemia, erythroblastosis fetalis, sickle cell anemia and thalassemia.	
Describe blood groups and principles of blood transfusion. List transfusion reactions and related complications.	
Summarize organ transplantation requirements.	
Explain Platelet production, regulation & functions. Classify Thrombocytopenias outline the pathophysiology of each type.	
Draw and label a flowchart of the extrinsic and intrinsic pathway of coagulation. Explain the regulation of both pathways. Relate to Haemophilia, Von Willebrand disease & Christmas disease. Define Bleeding time & clotting screen.	
GASTRO-INTESTINAL SYSTEM	3
Describe the general structure & organization of the gastrointestinal system (GIT). Outline the principles of GIT movements. Describe mastication, deglutition, vomiting & defecation. Describe secretory functions of saliva, gastric juice, pancreatic juice, intestinal juice & bile.	
RENAL PHYSIOLOGY	3
State the functions of kidney. Draw and label a nephron. Outline the function of a nephron. Describe glomerular filtration and its regulation Explain micturation reflex. Describe mechanism of concentration of	

urine.	
ENDOCTINE SYSTEM	3
Explain the general organization & importance of the endocrine system. Outline the function and regulation of hormones from the following glands: pituitary, thyroid, parathyroid, pancreas & adrenal. Relate clinically to diabetes mellitus <i>and other conditions resulting from hormonal imbalance.</i>	
NERVOUS SYSTEM	10
Explain the organization of the nervous system. Describe synaptic transmission .	
Outline the basic concept of sensory, motor & integrative functions of the nervous system.	
Describe cerebral blood flow & cerebrospinal fluid system. Outline the functions of cerebral cortex; spinal cord; cerebellum; basal ganglia; thalamus & hypothalamus.	
Describe the physiology of pain & endogenous pain control mechanisms.	
Discuss temperature regulation.	
Explain the organization & general functions of autonomic nervous system.	
Outline the structure and physiology of special sense organs.	

PHYSIOLOGY LABORATORY ASSIGNMENTS

HAEMATOLOGY

1. RBCs count
2. Haematocrit
3. Determination of haemoglobin (HB %)
4. Packed cell volume (PVC)
5. Total leukocyte count (TLC)
6. Differential leukocyte count (DLC)
7. Erythrocyte sedimentation rate (ESR)
8. Bleeding time (BT)
9. Prothrombin time
10. Thrombin time
11. Blood grouping

RESPIRATORY SYSTEM

1. Measurement of pulmonary volumes & capacities (Spirometry)

NERVOUS SYSTEM

1. Examination of superficial & deep reflexes
2. Clinical examination of cranial nerves

CARDIOVASCULAR SYSTEM

1. Cardiopulmonary resuscitation
2. Cold presser test
3. Triple response
4. Examination of arterial pulse