

السنة الأولى – الفصل الصيفي  
مقدمة إلى علم وظائف الأعضاء  
**Introduction to Physiology**  
**(0501110)**

Introduction to physiology is a two credit hours course that covers the definition of physiology and the systems involved. It includes the study of basic principles of physiology that involve subjects like, physiological units, biological membranes, transport, homeostasis, body fluids, membrane potentials, hemodynamics and laws of blood flow.

**Introduction to Physiology: Topics**

1. Introduction to Physiology: General outline of physiology
2. Unites
  - A. Mole
  - B. Osmole
  - C. Equivalent
  - D. Osmolarity, Osmolality, isotonic, hypotonic, hypertonic etc.
3. Concepts of feedback mechanism (negative and positive feedback)
- 4- Homeostasis
  - A. Composition of ECF.
  - B. Composition of ICF.
5. Body Water
  - A. Distribution.
  - B. Osmosis
  - C. Measurements.
6. Cell Membrane Structure
7. Transport (Passive)
  - A. Simple Diffusion (criteria, factors determine diffusion)
  - B. Facilitated Diffusion.
8. Transport (Active)
  - A. Primary Active.
  - B. Secondary Active: Co-and countert-transport
9. Phagocytosis and Pinocytosis
10. Excitable membranes  
Resting Membrane potential: origin and determinants.
11. Electrochemical Equilibrium (Nernst equation).
12. Goldman-Hodgkin-Katz Equation
13. Action Potential  
Determinants and propagation
14. Special Types of AP: (Slow Response AP) and the Pacemaker concept
15. Cardiac Action Potential (Fast Response AP)
16. Latent and ectopic pacemakers.
17. All or none versus graded AP
18. Basic neuronal circuits:
19. Synapses: types, transmission of AP, neurotransmitters, facilitation, inhibition, summation, electrical events, processing, fatigue...etc.
20. Excitatory postsynaptic potential
21. Inhibitory postsynaptic potential
22. Receptors: types and adaptation
23. Neurons: types, classification

- 24. Signal Transduction (Regulation of cellular machinery)
  - Extracellular regulators: nervous, endocrine, paracrine and autocrine.
  - Receptors: membrane or intracellular
  - Ion channels
  - G-protein
  - Enzyme linked
  - Intracellular
  - Second messengers
    - cAMP and cGMP
    - Phospholipid
  - Calcium calmodulin
  - IRS
- 25. Steroids: Their Signal Transduction And Mechanism Of Action
- 26. Autonomic Nervous System (I)
  - Organization: Sympathetic and Parasympathetic
- 27. Autonomic Nervous System (II)
  - Neurotransmitters, types, synthesis, location (preganglionic, postganglionic)
  - Receptors: types and location.
  - Adrenal medulla
- 28. Microcirculation
  - Capillary structure; fluid filtration (forces) & reabsorption;
- 29. Starling law of capillary exchange
- 30. Lymphatic system
- 31. Interrelationship Among Pressure, Flow And Resistance.
  - Poiseuille's Law.
  - Types of flow laminar versus turbulent.