

**Biology 3201 Outcomes**  
**Unit IA**  
**Maintaining Dynamic Equilibrium II**

**The Nervous System**

1. Analyze the nervous system and explain its structure and dynamics
  - I. Explain the basic structure and function of the central nervous system. Include:
    - a. brain
    - b. spinal cord
  - II. Explain how the nervous system is protected. Include:
    - a. skull
    - b. meninges
    - c. cerebrospinal fluid
  - III. Explain the basic structure and function of the brain. Include:
    - a. cerebrum
    - b. cerebellum
    - c. medulla
    - d. thalamus
    - e. hypothalamus
    - f. midbrain
    - g. pons
    - h. corpus callosum
  - IV. Describe the basic functions of a peripheral nervous system. Include:
    - a. sympathetic
    - b. parasympathetic
2. Explain how the nervous system helps to maintain homeostasis
  - I. Describe the structure of the typical neuron and explain the function of each part. Include:
    - a. dendrite
    - b. cell body
    - c. axon
    - d. axon terminal
    - e. Schwann cells ( myelin sheath and nodes of Ranvier)
  - II. Describe the function of sensory neurons, motor neurons, and interneurons
  - III. Explain the ion distribution on the membrane of a neuron ( at rest, depolarization, and repolarization) and the influence of myelin
  - IV. Explain the meaning of the term **threshold** and describe the **all or none principle**
  - V. Describe the transmission of an impulse along the length of a neuron, across a

synapse or neuromuscular junction, and the effects of transmitters involved.

Include the following neurotransmitters:

- a. acetylcholine
  - b. noradrenaline
  - c. glutamate
  - d. GABA
  - e. dopamine
  - f. serotonin
3. Identify the role of certain compounds to neuron function - oxygen, glucose, ATP, sodium ions
  4. Analyze homeostatic phenomena to identify the feedback mechanisms involved
    - I. describe a reflex arc
  5. Describe disorders linked to the nervous system and their effect on homeostasis of the system and the organism as a whole:
    - a. Multiple Sclerosis
    - b. Alzheimer's Disease
    - c. Parkinson's Disease
    - d. Meningitis
    - e. Huntington's Disease
  6. Describe methods used to treat stroke and spinal cord injury
  7. Describe the technologies
    - a. MRI
    - b. EEG
    - c. CAT
  8. Describe how prescription and non-prescription drugs can have a role in maintaining or disrupting homeostasis
    - a. anaesthetics
    - b. prescription drugs
    - c. illegal drugs
    - d. legalized drugs (alcohol, nicotine, caffeine)
  9. Debate the merits of using drugs for treatment of nervous disorders against long term effects
  10. Debate the legalization of marijuana for medicinal purposes
  11. Explain how the eye as a sense organ helps to maintain homeostasis
  12. Describe the general structure and function of the eye. Include:
    - a. lens
    - b. iris
    - c. retina
    - d. cornea
    - e. choroid layer
    - f. fovea
    - g. rods
    - h. cones
    - i. pupil

j. blind spot

13. Trace the path of light through the eye and explain how the amount of light entering the eye is regulated.
14. Describe and analyze examples of disorders of the eye and technologies for correction of visual defects
  - a. eye disorders - glaucoma, astigmatism, myopia, hyperopia
  - b. treatments- glasses, corneal transplant, laser surgery
15. Explain how the ear as a sense organ helps maintain homeostasis
16. Describe the general structure and function of the ear. Include:
  - a. tympanic membrane
  - b. ossicles ( malleus, incus, stapes)
  - c. eustachian tube
  - d. semi-circular canals
  - e. cochlea
17. Describe and analyze examples of disorders of the ear and technologies for correction or treatment
  - a. ear disorders - conduction deafness, nerve deafness
  - b. treatments for disorders - eustachian tube implants, hearing aids, cochlear implants
18. Evaluate ethical decisions regarding the consequences of medical treatments of eye disorders (possible mandatory eye organ donations) or auditory disorders (sense of exclusion in persons receiving cochlear implants).