BIOL 235- Anatomy and Physiology II Course Information

Common Course Outline

Description:
Anatomy and Physiology II is an introduction to the structure and function of the human body under normal and abnormal conditions. It is the second in a two course series. It will cover the autonomic, endocrine, immune, respiratory, digestive urinary and reproductive systems. It will also cover fluid electrolyte, acid-base balance, blood, blood pressure regulation and functional characteristics of the heart, special senses, development and inheritance. This course also has a lab component in which students will perform hands on activities to test some of the theories taught in lecture. This course is designed for those students preparing for careers in health-related fields. (Prerequisite- BIOL 225- Anatomy and Physiology I) (MNTC 3)

Instructional Level:
Associate Degree

Total Credits: 4

Total Hours: 80

Prerequisites / Corequisites
Prerequisite: Completion of Anatomy and Physiology I - BIOL225

Course Competencies

Describe sensory pathways and the somatic nervous system
Learning Objectives
Identify the components of afferent and efferent divisions of the nervous system
Explain how receptors respond to specific stimuli and how the organization of the receptor affects its sensitivity
Describe the somatic motor pathways and the levels of motor control

Describe the autonomic nervous system
Learning Objectives
Compare and contrast the sympathetic and parasympathetic branches
Explain the mechanism of neurotransmitter release and their affect of target organs and tissues.
Discuss the significance of dual innervation and autonomic tone

Explain aspects of higher order functions of the central nervous system
Learning Objectives
Explain how memories are created, stored and retrieved
Distinguish among the levels of consciousness

Describe the mechanisms involved in processing sensory information
Learning Objectives
Identify and describe the functions of the hormones produced by the kidneys, heart, thymus, testes, ovaries and adipose tissue
Identify the structures and functions of the eye and ear
Explain the physiological mechanisms involved in hearing, seeing and equilibrium

Explain how the endocrine system helps regulate body function
Learning Objectives
Explain the general mechanisms of hormonal action on target tissues
List and describe the hormones of the hypothalamus
Describe the relationship between the pituitary and the hypothalamus
List and describe the function of the hormones produced by the pituitary, pineal gland and pancreas
Discuss the effects of abnormal pancreatic hormone production
List and describe the functions of hormones produced by the kidneys, heart, thymus, testes, ovaries and adipose tissue

Describe the components and major functions of blood
Learning Objectives
Describe the composition and functions of plasma
Explain the lifecycle and functions of red blood cells
Explain blood typing and the basis for ABO and Rh incompatibilities
Describe hemostasis

Describe the functional characteristics of the heart
Learning Objectives
Review the structures of the heart
Differentiate between contractile and pacemaker action potentials
Explain Frank-Starling's law, automaticity and why there is no summation and no recruitment
Identify the electrical events that are recorded on an electrocardiogram
Define cardiac output and describe factors that influence heart rate and stroke volume

Explain the mechanisms that regulate blood flow through vessels
Learning Objectives
Identify factors that influence blood pressure
Describe long and short term regulation of mean arterial pressure
Identify the Starling forces of the capillaries and the role they play in filtration and absorption
Predict how stressors will affect mean arterial pressure and the compensatory changes the body will make
Describe the relationship between vasoconstriction, mean arterial pressure and peripheral blood flow

Distinguish between specific and nonspecific immune defenses
Learning Objectives
Describe the mechanisms of nonspecific immunity
Compare cell mediated and humoral immunity
Discuss the types of T-cells and their roles in the immune response
Discuss the mechanisms of B-cell activation and differentiation
Describe the functions of antibodies including the primary and secondary responses to antigen exposure
Describe and give examples of immune disorders
Explain the effect stress has on the immune system

Describe the respiratory system
Learning Objectives
Identify the structures of the respiratory system
Explain the mechanics of breathing
Describe gas transport between the lungs and the tissues
Describe the function and structure of hemoglobin
Explain neural regulation of respiration and how certain factors affect breathing rate and depth

Describe the digestive system
Learning Objectives
Identify organs of the digestive system and list their major functions
Describe the functional histology of the digestive tract
Outline the mechanisms that regulate digestion
Describe the structures, functions and regulation of accessory organs
Identify the regional areas in the small and large intestine for nutrient absorption
Describe the mechanisms of digestion and absorption of fats, carbohydrates and proteins

Explain the process of metabolism
Learning Objectives
Describe the steps in cell respiration and the energy yields in each step
Summarize the main processes of lipid and protein metabolism

Explain the urinary system
Learning Objectives
Locate the major structures in the urinary system and discuss their functions
Discuss transport along the different segments of the nephron tubule
Describe the process of urine formation
Explain the hormonal influence of the volume and concentration of urine
Identify normal constituents of urine
Analyze urine samples and make diagnoses based on test results
Discuss the process of urination including the micturition reflex

Discuss fluid, electrolyte, and acid–base balance
Learning Objectives
Explain how fluid, electrolyte and acid-base balance is important for homeostasis
Identify hormones involved in fluid and electrolyte regulation
Identify how hydrostatic and osmotic pressures regulate water and electrolyte movement
Discuss mechanisms for maintaining ion and electrolyte balance
Describe the compensatory mechanisms involved in acid-base balance maintenance
Identify common causes for acid-base imbalances and the mechanisms for correcting the imbalances

Describe the reproductive system
Learning Objectives
Identify the structures of the male and female reproductive systems
Discuss the process of gametogenesis
Identify the reproductive hormones, their origins and their functions
Summarize the hormonal regulation of the uterine and ovarian cycles
Discuss the physiology of sexual intercourse in males and females
Describe the reproductive system changes that occur with age

Explain aspects of human development
Learning Objectives
Identify the stages of development
Describe the process of fertilization
Explain how developmental processes are regulated
Explain how the three germ layers help form the extraembryonic membranes
Discuss the importance of the placenta
Discuss the structural and functional changes of the uterus during pregnancy
List and describe the events that occur during labor and delivery

Relate basic principles of genetics to the inheritance of human traits
Learning Objectives
Define common genetics terms
Identify and describe inheritance patterns
Predict genotypic and phenotypic ratios using a Punnet square
Become proficient at reading human karyotypes

Demonstrate safe laboratory practices
Learning Objectives
Be aware of any hazardous materials in the lab
Handle chemicals and equipment in a safe manner

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