

**HIBBING COMMUNITY COLLEGE
COURSE OUTLINE**

COURSE NUMBER & TITLE: BIOL 1270: Human Anatomy and Physiology:
Support, Movement, and Control

CREDITS: 4 (3 Lec / 1 Lab)

PREREQUISITES: None

CATALOG DESCRIPTION:

Human Anatomy and Physiology 1 is the study of organ systems and tissues of the human body. Systems included are the integumentary, skeletal, muscular, nervous, and endocrine. Focus is on structures and the integrated control mechanisms of physiology in these systems. This course is intended for students in health-related fields as well as liberal arts students. MNTC goal area: (3) Natural Science

OUTLINE OF MAJOR CONTENT AREAS:

- I. Overview of anatomy and physiology
 - A. Structural organization
 - B. Functional characteristics
 - C. Homeostasis
- II. Basic chemistry and biochemistry
 - A. Bonds and reactions
 - B. Acids, bases, and salts
 - C. Organic compounds
- III. Cells and tissues
 - A. Membranes
 1. Transport
 2. Electrical potential
 3. Cell interactions
 - B. Epithelium
 1. Type
 2. Location
 3. Function
 - C. Connective tissue
 - D. Muscle tissue
 - E. Nervous tissue
 - F. Tissue repair
- IV. Integumentary system
 - A. Epidermis
 - B. Dermis and skin color
 - C. Hair, nails, and glands
 - D. Functions of skin
 1. Protection
 2. Temperature regulation
 3. Secretion

- 4. Synthesis
- V. Skeletal system
 - A. Structure of bone
 - B. Bone development and growth
 - C. Calcium regulation
 - D. Remodeling and repair
 - E. Skeletal anatomy
 - F. Joint anatomy
- VI. Muscular system
 - A. Skeletal muscle anatomy
 - B. Muscle and muscle fiber contraction
 - 1. Single fiber contraction
 - 2. Motor unit coordination
 - C. Muscle metabolism
 - 1. Effects of exercise
 - 2. Comparison of smooth muscle
 - D. Skeletal muscle physiology
 - E. Muscle-bone-joint relationships
 - 1. Lever systems
 - 2. Movements at synovial joints
- VII. Nervous system
 - A. Organization of the nervous system
 - B. Neurophysiology
 - 1. Synapse
 - 2. Neurotransmitters
 - C. The brain and spinal cord
 - D. Peripheral nervous system
 - 1. Receptors
 - 2. Motor endings
 - 3. Cranial nerves
 - 4. Spinal nerve reflexes
 - E. Autonomic nervous system
 - 1. Sympathetic division
 - 2. Parasympathetic division
 - 3. Interactions and control
 - F. Special senses
 - 1. Taste and smell
 - 2. Eye and vision
 - 3. Ear: hearing and balance
- VIII. Endocrine system
 - A. Hormones
 - 1. Target cell specificity
 - 2. Mechanisms of action
 - 3. Control of hormone release

- B. Endocrine organs
 - 1. Pituitary gland
 - 2. Hypothalamus interactions
 - 3. Other glands
 - 4. Integration and regulation

COURSE GOALS/OBJECTIVES/OUTCOMES:

Students will

1. describe the structural organization and major functions of the human body's organ systems.
2. define negative feedback and describe its role in maintaining body homeostasis.
3. differentiate between the transport processes through cell membranes and how they relate to the functions of each cell type.
4. explain the functional classification of tissues indicating their chief roles and locations.
5. describe the layers and appendages of the skin and explain how they relate to the general functions of the skin.
6. compare and contrast the two types of bone formation and how hormonal controls and physical stress regulate bone remodeling.
7. name and describe all bones and identify their important markings.
8. describe and compare the general structure of synovial, cartilaginous, and fibrous joints.
9. explain how muscle fibers are stimulated to contract and outline the sliding filament theory of contraction.
10. explain the factors that influence the force, velocity, and endurance of skeletal muscles and how they compare to smooth muscle.
11. describe the physical advantage of each type of lever system based on muscle attachment and joint location.
12. name and identify the major muscles and muscle groups of the body.
13. define and describe the fundamental nervous tissue function and how the action potential is transmitted across the synapse.
14. state the general functions and interactions of the major divisions of the brain and spinal cord.
15. name the twelve pairs of cranial nerves and describe the structures innervated by each.
16. outline the components of a reflex arc and test and explain spinal and cranial reflex activity.
17. compare and contrast the physiological effects of the sympathetic and parasympathetic divisions of the autonomic nervous system on the major organs in the body.
18. describe the structures and functions of the eye and explain how the receptors of all other special senses are activated.

19. describe the mechanisms by which hormones bring about their effects on their target tissues and describe how hormone release is regulated.
20. explain the feedback mechanism which regulates hormone release.

MNTC GOALS AND COMPETENCIES MET:

Natural Sciences

HCC COMPETENCIES MET:

Working Productively and Cooperatively

Communicating Clearly and Effectively

Thinking Creatively and Critically

Practicing Cultural, Economic, and Environmental Sustainability

STUDENT CONTRIBUTIONS:

Students are expected to attend all laboratory sessions, participate in and contribute to class discussions, complete all assignments on time, and request assistance when needed. Attendance is critical for the successful completion of this course.

**SPECIAL ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS
SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**

**SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS
MATERIALS, ETC.):**

Students are required to manipulate small sharp dissection instruments. Dissection is an integral component of this course. Exposure to chemical preservatives is minimal. Students may provide their own gloves (optional) which are available for purchase in the college bookstore. Students must observe all lab safety procedures.

AASC APPROVAL DATE: February 10, 2016
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REVIEW DATE: February 2021

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