

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO120

HUMAN ANATOMY & PHYSIOLOGY

5 Credit Hours

Prepared by:
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Last Revised Date:
July 2014

Minor Revision or Update by: Fran Moore
Per Curriculum Committee Process Change: April 25, 2018

Ms. Linda Abernathy, Division Chair, Math, Science & Business
Ms. Shirley Davenport, Dean, Arts & Science Education

BIO120 Human Anatomy and Physiology

I. CATALOG DESCRIPTION

- A. Prerequisites: High school biology and chemistry or equivalent (BIO101 and CHM101), with a grade of “C” or better within the previous five years of registration date, and reading proficiency
- B. 5 semester credit hours
- C. Human Anatomy and Physiology is the study of basic structure and function of the human body and covers fundamental concepts of all organ systems. Interactions of organ systems to maintain homeostasis are explored. Laboratory time is required. Students cannot apply both BIO120 and BIO211 toward graduation. (D)
- D. Curricular alignment:
- Fulfills part of Natural Sciences (Biological Sciences) with lab CORE requirement for AA, AAT, AFA, and select AAS degrees: MOTR LIFS 150L Human Biology with Lab
 - Elective course applies toward AA or AAT degree.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

| Expected Learning Outcomes | Assessment Measures |
|--|--|
| Demonstrate appropriate use of vocabulary to describe human anatomy and physiology in written and verbal communication | Exams, quizzes, and laboratory exercises |
| Describe the levels of organization in the human body from molecules to cells to tissues to organs and understand their relationships to one another in body systems | Exams, quizzes, and laboratory exercises |
| Locate and identify major structures of the following systems: integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, digestive, urinary, and reproductive | Exams, quizzes, and laboratory exercises |
| Explain the physiology of each of the following systems and their contributions to homeostasis: integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, digestive, urinary, and reproductive | Exams, quizzes, case studies, and laboratory exercises |
| Demonstrate wise decisions about health and human activity through understanding of how body systems work together to maintain homeostasis | Exams, quizzes, and case studies |

III. OUTLINE OF TOPICS

- A. Organization of the human body
 1. Recognize and describe anatomical position
 2. Use descriptive terms to describe planes, directions, cavities, and points of reference associated with specific regions of the body
 3. Explain mechanisms of negative feedback and positive feedback and provide physiological examples of each

- B. Molecules
 1. Explain why water is so important to life
 2. Relate the pH scale to hydrogen ion concentration and understand the importance of pH homeostasis; explain the action and importance of a buffer
 3. Discuss the structure and function of carbohydrates, lipids, proteins, and nucleic acids in biological organisms
 4. Discuss the elements of a healthy diet and be able to interpret a nutrition panel on foods
 5. Explain the importance of enzymes to living organisms

- C. Cell biology
 1. Discuss the role of cellular structures including the plasma membrane, cytoskeleton, mitochondria, chloroplasts, ribosomes, and nucleus
 2. Explain the structure and function of the plasma membrane
 3. Outline the processes that are used to move materials across a membrane
 4. Follow the synthesis of a protein intended for secretion from the cell

- D. Tissues

Recognize the four basic tissue types in the human body and describe the general functions of each.

- E. Integumentary system
 1. List and explain the components and functions of the integumentary system
 2. Explain two ways in which structures in the skin can help regulate body temperature
 3. Describe the steps in repair of injuries to the skin
 4. Explain how third-degree burns interfere with homeostasis and how they are treated

- F. Skeletal system
 1. List and explain the functions of the skeletal system
 2. Recognize basic anatomical and histological terminology
 3. Identify the major elements of the axial skeleton and the appendicular skeleton

4. Explain the processes of bone growth and repair
5. Discuss the types of joints and the movements at synovial joints

G. Muscular system

1. List and explain the functions of the muscular system
2. Recognize basic anatomical and histological terminology
3. Identify major muscles and list their actions, origins, and insertions
4. Explain the mechanism of muscle contraction (sliding filament theory)
5. Describe the events that occur at the neuromuscular junction
6. Define a motor unit and explain how it is important in contractions of various strengths

H. Nervous system

1. Explain the origin of the resting potential, action potential, and synaptic potential
2. Describe the structure and function of a neuron
3. Describe the roles of glial cells, meninges, and cerebrospinal fluid
4. Explain efferent and afferent pathways and the reflex arc
5. List the components and describe the primary functions of the spinal cord and brain
6. Describe the structure and primary functions of the divisions of the autonomic nervous system

I. Endocrine system

1. Compare and contrast the mechanisms of regulation seen in the nervous system and the endocrine system
2. Contrast the mechanisms of action of non-steroid hormones and steroid hormones
3. Give examples of how these mechanisms of regulation operate: releasing hormones, negative feedback, antagonistic hormones
4. Locate the primary endocrine organs and explain the role of their secretions

J. Cardiovascular system

1. Identify and describe the basic structure and function of the heart
2. Describe pulmonary and systemic circulation patterns; know blood flow through the heart
3. Describe the structure of arteries, capillaries, and veins; describe blood pressure in each
4. Explain the role of the lymphatic system in circulation of body fluids.
5. Explain the roles of formed elements in the blood
6. Explain how gasses are carried in the blood and the role of the bicarbonate buffer system (and the equation)

K. Respiratory system

1. Describe the anatomy and histology of the pulmonary organs
2. Explain respiratory volumes and capacities
3. Explain how respiration is regulated
4. Explain the relationship between breathing and cellular respiration (and write the equation)

- L. Digestive system
 1. Identify the digestive and accessory organs and describe their functions
 2. Describe and locate the primary functions of mechanical and enzymatic digestion, absorption, and elimination
 3. Explain the local regulation of the digestive system
 4. Describe the primary functions of the liver and the operation of the hepatic portal system

- M. Urinary system
 1. List and explain the functions of the urinary system.
 2. Describe the structure of the kidney and the location of the parts of the nephron
 3. Explain the three steps in urine formation and identify where each occurs
 4. Explain how hormones can regulate the composition of body fluids
 5. Explain how the urinary and respiratory systems work together to regulate pH

- N. The reproductive system
 1. List the hormones involved in both male and female reproduction, know where these hormones are produced, and their targets
 2. Contrast the functions of the male reproductive system and the female reproductive system and explain how the systems are adapted to fulfill these functions
 3. Explain why female fertility is highest two days before ovulation until one day after ovulation
 4. Describe where fertilization occurs in the female reproductive system; trace the path and timing of the fertilized egg develop before it implants in the uterus
 5. If fertilization does not occur, describe the levels of hormones (FSH, LH, estrogen, and progesterone) and the activities within the ovary and uterus from days 1-28 of the menstrual cycle

IV. METHODS OF INSTRUCTION

- A. Lecture and PowerPoint presentations to support text reading assignments
- B. Case studies
- C. Online resources (videos, self-quizzing, etc.)
- D. Laboratory exercises

V. REQUIRED TEXTBOOKS

VanPutte, C. L., & Regan, J. L. *Seeley's Essentials of Anatomy & Physiology* (current edition). New York: McGraw-Hill.

(Textbook packaged with *Anatomy and Physiology Revealed* and access to *Connect* web resource)

Patton, K. T. *Laboratory manual [for] Seeley's Essentials of Anatomy & Physiology* (current edition). New York: McGraw-Hill.

VI. REQUIRED MATERIALS

- A. Textbook with *Connect* web support
- B. Laboratory manual
- C. Online access to STARS and Blackboard

VII. SUPPLEMENTAL REFERENCES

- A. Library resources: present offerings and anticipated texts, journals, video/audio tapes, software, etc.
- B. Internet references

VIII. METHODS OF EVALUATION

- A. Lecture exams and comprehensive final exam 55%
- B. Class activities, case studies, and quizzes 15%
- C. Laboratory 30%
- D. Grading
Scale: 90-
100% = A
80-89% = B
70-79% = C
60-69% = D
Below 60% = F

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.

General Education Curriculum and Assessment Alignment Map

BIO120 Human Anatomy & Physiology

MOTR LIFS150LAP Human Biology with Lab

| JEFFERSON COLLEGE ACADEMIC SKILL COMPETENCY TABLE | | | | |
|--|--|---|--|---|
| <p>Embedded across the General Education program curriculum as well as in more advanced coursework, students learn the following academic skills, characteristics, and practices that reflect the competencies of educated persons needed for continuous learning in complex, diverse, and changing environments; full civic engagement; and fulfillment of personal life goals. Such competencies help students continue to learn and acquire new skills to deal with constantly evolving environments. These competencies are developed and applied over the full General Education program curriculum, not in any single course.</p> | | | | |
| Institutional Goal (adopted by Assessment Committee Oct 21, 2018) linked to MOTR CORE 42 Academic Skill Basic Competencies https://dhe.mo.gov/core42.php The framework for Missouri's CORE 42 is designed for students to obtain the basic competencies of Valuing, Managing Information, Communicating, and Higher-Order Thinking through the completion of at least 42-semester hours distributed across the broad Knowledge Areas of Communications, Humanities & Fine Arts, Natural & Mathematical Sciences, and Social & Behavioral Sciences. The basic competencies are achieved through completion of the CORE 42 in its entirety. | Jefferson College General Education Academic Skill Competencies (adopted by Curriculum Committee January 13, 2016) | Course Expected Learning Outcomes and Corresponding Assessment Measures aligned to General Education Academic Skill Competencies | | Jefferson College General Education Program Assessment |
| | | Course Expected Learning Outcome | Course Assessment | |
| Higher Order Thinking Higher Order Thinking is the ability to distinguish among opinions, facts, and inferences; to identify underlying or implicit assumptions; to make informed judgments; to solve problems by applying evaluative standards; and demonstrate the ability to reflect upon and refine those problem-solving skills. This involves creative thinking, critical thinking, and quantitative literacy. | Critical Thinking - Apply logic, scientific methodology, and quantitative reasoning to develop, express, and defend solutions and conclusions across the curriculum | Demonstrate wise decisions about health and human activity through understanding of how body systems work together to maintain homeostasis | Assessment Measure (Official Course Syllabus Section II): Case studies Method of Evaluation (Official Course Syllabus Section VIII): Case studies | General Education Academic Skill Competency Development (ASCD) assessment project (evaluation of student artifacts using the following rubric(s) and student opinion survey) <ul style="list-style-type: none"> • Critical Thinking (https://drive.google.com/open?id=0B5vQj2-5JyzWYjZPYnRRVW1oaXc) |
| Managing Information Managing Information is the ability to locate, organize, store, retrieve, evaluate, synthesize, and annotate information from print, electronic, and other sources in preparation for solving problems and making informed decisions. Through the effective management of information, students should be able to design, evaluate, and implement a strategy to answer an open-ended question or achieve a desired goal. | Information Literacy - Identify, access, and critically evaluate relevant information sources for use in creating new knowledge, solving problems, and participating ethically in communities of learning. | Describe the levels of organization in the human body from molecules to cells to tissues to organs and understand their relationships to one another in body systems | Assessment Measure (Official Course Syllabus Section II): Exams Method of Evaluation (Official Course Syllabus Section VIII): Responses to exam presents student's general facility with concept of levels of | General Education Academic Skill Competency Development (ASCD) assessment project (evaluation of student artifacts using the following rubric(s) and student opinion survey) <ul style="list-style-type: none"> • Information Literacy VALUE Rubric from AAC&U (https://drive.google.com) |

General Education Curriculum and Assessment Alignment Map

BIO120 Human Anatomy & Physiology

MOTR LIFS150LAP Human Biology with Lab

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|--|---|--|--|--|
| | | | organization--a central principle that will be applied to all organ systems. | /open?id=0B5vQj2-5JyzWYk9OY3JZQ0Rubmc |
| NOT aligned to an Institutional or MDHE goal | Technology Literacy - Select and utilize appropriate technology to achieve academic and professional objectives. | Explain the physiology of each of the following systems and their contributions to homeostasis: integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, respiratory, digestive, urinary, and reproductive | Assessment Measure (Official Course Syllabus Section II): Laboratory exercises are collected and graded Method of Evaluation (Official Course Syllabus Section VIII): Laboratory exercises use iWorx equipment. | General Education Academic Skill Competency Development (ASCD) assessment project (evaluation of student artifacts using the following rubric(s) and student opinion survey) • Yet to be created rubric |

Faculty responsible for alignment: **Dr. Bruce L. Carr**

Date of GEPC review: Spring 2019