

## Course Information

BIOL216  
Human Anatomy and Physiology II  
Summer 2017 (May 22 – July 22)  
4 Credit Hours

## Instructor Information

**Tessa Durham-Brooks, PhD**  
Doane University

## Contact Information

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## Communicating With the Instructor

This course uses a “three before me” policy in regards to student to faculty communications. When questions arise during the course of this class, please remember to check these three sources for an answer before asking me to reply to your individual questions:

1. Course syllabus
2. Announcements in Blackboard
3. The “Water Cooler” discussion board

This policy will help you in potentially identifying answers before I can get back to you and it also helps your instructor from answering similar questions or concerns multiple times.

If you cannot find an answer to your question, please first post your question to the “Water Cooler” discussion board. Here your question can be answered to the benefit of all students by either your fellow students who know the answer to your question or the instructor. You are encouraged to answer questions from other students in the discussion forum when you know the answer to a question in order to help provide timely assistance.

If you have questions of a personal nature such as relating a personal emergency, questioning a grade on an assignment, or something else that needs to be communicated privately, you are welcome to contact me via email or phone. My preference is that you will try to email me first. Please allow 24 hours for me to respond to emails Monday-Friday and 48 hours on the weekend.

If you have a question about the technology being used in the course, please contact the Doane University Help Desk for assistance (contact information is found in the Technical Support Contact Information section).

## Course Catalog Description

In this course we will study the structure and function of the human body, beginning with cells and tissues and then continuing with the study of the 11 major systems. Upon successful completion of this course students will have a solid foundation in function of the human body with an emphasis on maintenance of homeostasis and be prepared for basic clinical course-work.

## **Course Overview**

One of the main goals of this course is to give you a solid understanding of the processes within the body that maintain conditions for life. To truly understand the coordination of the many different organ systems we'll study information flow within the body at different organizational levels. We'll look at energy usage within the body, how energy is obtained and how it is spent and how the balance between intake and output is maintained. At the end of this course you will have a clear understanding of reflex arcs within the body that allow the body to sustain a consistent internal environment, even while responding to a changing external environment. Knowledge of these homeostatic mechanisms will allow you to understand how pathological conditions occur when any of these underlying processes are disrupted. These are complex topics, but they're fascinating, and absolutely vital to understand in order to pursue many research and medical fields.

## **Course Prerequisites**

One entry level biology class (for example, 101, 110, or 111)

## **Course Textbook and Materials**

### **Required**

Hole's Human Anatomy and Physiology by Shier et al, 14<sup>th</sup> edition CONNECT Access Code with eBook (ISBN – 9781259295676).

## **Learning Objectives**

### **Course Objectives**

At the completion of this course students will be able to:

- 1) Identify how physiological parameters are regulated through reflex pathways (homeostatic mechanisms) and predict how misregulation of these pathways results in disease.
- 2) Determine and diagram information flow at cellular (intra AND inter) and organismal levels, and explain how that is used to detect, process and respond to stimuli.
- 3) Compare and contrast the different forms of energy usage (chemical, transport and mechanical).
- 4) Hypothesize physiological changes when presented with injury or pathological structural change, or when presented with hypothetical physical environment conditions.

### **Unit Objectives**

- 1) **Unit 1: Defining life and chemistry review/intro**

- a) List and describe the major requirements of organisms to maintain life
- b) Describe the parts of the homeostatic mechanism and explain how it is used to maintain conditions for life
- c) Explain the pH scale and the function of buffers in resisting pH change
- d) List the major groups of inorganic chemicals and organic molecules common in cells and explain the function(s) of each group
- e) Explain and diagram how substances are transported between cellular compartments and across the plasma membrane using active and passive processes
- 2) **Unit 2: Energy usage and acquisition**
  - a) Describe the process and control of metabolic reactions
  - b) Explain the processes cells use to store chemical energy and how that energy is used to mediate chemical, transport, and mechanical work in the cell.
  - c) Identify the function and regulation of enzymes secreted by the digestive organs and glands
  - d) Explain and diagram reflex pathways for hormonal control of appetite
  - e) List the major sources and cellular uses of carbohydrates, lipids and proteins
  - f) Identify examples of positive and negative nitrogen balance and predict physiological effects of either condition
  - g) Explain the factors that affect an individual's energy requirements
- 3) **Unit 3: Systems (Integumentary, skeletal, muscular)**
  - a) Explain how the skin helps regulate body temperature
  - b) Discuss the major functions of bones
  - c) Describe and diagram the mechanism of skeletal muscle contraction including neural control, major events and energy sources.
  - d) Describe how a muscle may become fatigued and how oxygen debt may play a role
  - e) Compare ATP energy production in type I and type II muscle fibers and describe how that affects the functional differences between them
  - f) Compare the contraction mechanisms of skeletal, cardiac and smooth muscle fibers
- 4) **Unit 4: Neural information flow**
  - a) Describe and diagram the nervous system as a series of neurons in a reflex pathway containing sensory receptors and neurons, the central nervous system (integrating center) and outputs via somatic motor and autonomic innervation of target organs and tissues
  - b) Describe the structure and function the five types of sensory receptors and how they are able to respond to stimuli. Be able to classify whether they are part of the general or special senses
  - c) Describe how somatic motor and autonomic neurons are able to stimulate effectors in response to stimulus
  - d) Describe the events leading to the generation of an action potential and how action potentials move down myelinated and unmyelinated axons
  - e) Explain how information passes from a presynaptic neuron to a postsynaptic cell
  - f) Describe how membrane potential changes stimulates by excitatory and inhibitory neurotransmitters sum to affect membrane potential in the trigger zone
  - g) Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system to include neuronal arrangement, neurotransmitters used and effects on target tissues
- 5) **Unit 5: Chemical information flow**
  - a) Explain the responses are stimulated in target cells by steroid and nonsteroid

hormones

- b) Discuss how negative feedback mechanisms regulate hormone secretion
- c) Explain how the nervous system controls hormone secretion through neuroendocrine pathways
- d) For each of the major endocrine glands, identify the hormones they secrete, how hormone secretion is regulated, and actions of the individual hormones. Hypothesize deficits if there were an imbalance with any single hormone.
- e) Explain how hormones control the activities of the male reproductive organs and the development of male secondary sex characteristics
- f) Explain how hormones control the activities of the female reproductive organs and the development of female secondary sex characteristics

6) **Unit 6: Circulatory system**

- a) Define hemostasis and explain the local and reflex control mechanisms that help to achieve it
- b) Describe the cardiac cycle and explain how heart sounds are produced
- c) Identify the parts of a normal ECG pattern and discuss the significance of this pattern
- d) Explain how heart rate and stroke volume are regulated by the autonomic nervous system and by physical properties of the heart
- e) Explain how blood pressure is produced and controlled through local and reflex control pathways
- f) Compare the pulmonary and systemic circuits of the cardiovascular system
- g) Describe how tissue fluid and lymph form, and explain the function of lymph

7) **Unit 7: Respiratory system**

- a) Explain why respiration is necessary for cellular survival
- b) Describe each of the respiratory air volumes and capacities
- c) Show how alveolar ventilation rate is calculated
- d) Locate the respiratory areas within the central nervous system and explain control of normal breathing
- e) Describe the structure and function of the respiratory membrane
- f) Explain the importance of partial pressure in diffusion of gases
- g) Explain how the blood transports oxygen and carbon dioxide
- h) Describe gas exchange in the pulmonary and systemic circuits

8) **Unit 8: Urinary system and the maintenance of water, electrolyte, and acid-base balance**

- a) Explain how urine is produced, starting with the formation of glomerular filtrate and identifying the changes in glomerular filtrate as it passes through the renal tubule
- b) Identify the characteristics of a countercurrent mechanism and explain its role in concentrating the urine
- c) Explain the importance of maintaining a consistent balance of water and electrolytes within the body, and discuss how fluid and electrolyte balance are interdependent
- d) Describe how body fluids are distributed between intracellular and extracellular compartments, how fluid composition varies between them, and how fluids move from one compartment to another under the force of hydrostatic and osmotic pressure
- e) List the routes by which water and electrolytes enter and leave the body and the regulation of both processes
- f) Explain how chemical buffer systems, the respiratory center and the kidneys keep

- the pH of body fluids relatively constant
- g) Describe the consequences and causes of increase or decrease in body fluid pH

## Course Requirements

### Attendance Policy

You should plan to work on this course everyday. This means that you absolutely **must have a reliable and consistent internet connection** throughout the duration of the course. This also strongly suggests that **you should not plan to take any vacations** during this course. This is a condensed, fast-pace, course and it would be extremely difficult to catch up after a prolonged absence.

### Online Course

This is an online course and therefore there will not be any face-to-face class sessions. All assignments and course interactions will utilize internet technologies.

### Computer Requirements

This course requires that you have access to a computer that can access the internet. You will need to have access to, and be able to use, the following software packages:

- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader (free)
- Adobe Flash Player (free)
- Microsoft Word

You are responsible for having a reliable computer and internet connection throughout the course.

Your computer should come with a camera and/or you need to have a camera on your phone (for self-introductions, presentations, digital meetings, and other activities).

### Email and Internet

You must have an active Doane University e-mail account and access to the Internet. *All instructor correspondence will be sent to your Doane University e-mail account.* Please plan on checking your Doane Gmail account regularly for course related messages.

This course uses Blackboard for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The Blackboard Course Site can be accessed at <http://bb2.doane.edu>

### Campus Network or Blackboard Outage

When access to Blackboard is not available for an extended period of time (greater than one entire evening - 6pm till 11pm) you can reasonably expect that the due date for assignments will be changed to the next day (assignment still due by midnight).

### Attendance/Participation

*Preparation* for class means reading the assigned readings & reviewing all information required for that week. *Attendance* in an online course means logging into the Blackboard

and on a regular basis and *participating* in the all of activities that are posted in the course.

### **Studying and Preparation Time**

The course requires you to spend time preparing and completing assignments. A three-credit course requires 144 hours of student work. Therefore expect to spend approximately 18 hours a week preparing for and actively participating in this 8-week course.

### **Late or Missed Assignments**

ALL assignments must be finished and turned in to complete the course. This course moves quickly and it is imperative that you keep up with the pace of the course. Unless the instructor is notified BEFORE the assignment is due and provides an opportunity for the student to submit his/her assignment late, points will be taken off for a late assignment. All scores for assignments submitted after the due date will be assessed a minimum 20% deduction daily. Please note that all assignments are due by midnight Central Standard Time and plan accordingly.

### **Rewrites**

Students may submit their assignments ahead of their due date for review by the instructor as long as the assignment is provided a minimum of three days prior to the course due date. The instructor will provide feedback on the assignment for consideration by the student.

### **Submitting Assignments**

All assignments, unless otherwise announced by the instructor, MUST be submitted via Blackboard. Each assignment will have a designated place to submit the assignment.

### **Drop and Add dates**

If you feel it is necessary to withdraw from the course, please contact your advisor for full details on the types of withdrawals that are available and their procedures.

### **Subject to change notice**

All material, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor, review the course site regularly, or communicate with other students, to adjust as needed if assignments or due dates change.

### **Academic Integrity**

Doane University expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. Academic dishonesty, the act of knowingly and willingly attempting or assisting others to gain academic success by dishonest means, is manifested in various measures. Gehring, et al, (1986) suggests that four categories of academic dishonesty exist<sup>1</sup>:

- a. Cheating
- b. Fabrication
- c. Facilitating academic dishonesty
- d. Plagiarism

For more information on academic integrity, please visit the website:

## Course Grading

### Grades, Grading Scale, Feedback

Assignment of letter grades is based on a percentage of points earned. The letter grade will correspond with the following percentages achieved. All course requirements must be completed before a grade is assigned.

A	100 – 90
B	89 – 80
C	79 – 70
D	69 – 60
E	59 and below

**See the requirements for the specific Assignments on Blackboard.**

**Your grade will be determined based on the following weighted categories:**

Weekly Connect exercises : 15%

Virtual labs (select weeks) : 10%

Weekly reading quizzes : 10%

Weekly short answer questions: 20%

Weekly Concept map assignment : 20%

Weekly Science Communication assignments : 20%

Final : 5%

**Feedback:** Please allow 3-5 days for feedback on assignments. This timeframe is dependent upon the level of detail that I provide and the number of students in the course. I expect you to read my feedback and make changes if needed. If you do not know how to look at feedback using the My Grades tool in Blackboard, please notify me immediately.

## How to Succeed in this Course

- Check your Doane email regularly
- Log in to the course web site daily
- Communicate with your instructor
- Create a study schedule so that you don't fall behind on assignments

## Accessibility Statement

In compliance with the Rehabilitation Act of 1973, Section 504, and the Americans with

Disabilities Act of 1990, professional disability specialists and support staff at Doane University facilitate a comprehensive range of academic support services and accommodations for qualified students with disabilities. Doane University staff coordinate transition from high schools and community colleges, in-service training for faculty and staff, resolution of accessibility issues, community outreach, and collaboration between all Doane University regarding disability policies, procedures, and accommodations.

## **Student Conduct Statement**

Students are required to adhere to the behavior standards listed in **Doane University Policy Manual**

Appropriate classroom behavior is defined by the instructor. This includes the number and length of individual messages online. Course discussion messages should remain focused on the assigned discussion topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion. Inappropriate discussion board messages may be deleted if an instructor feels it is necessary. Students will be notified privately that their posting was inappropriate.

Student access to the course Send Email feature may be limited or removed if an instructor feels that students are sending inappropriate electronic messages to other students in the course.

## **Technical Support Contact Information**

For technical assistance 24 hours a day, 7 days a week, please contact the Doane University Technology Office Help Desk:

Phone: 402-826-8411  
Email: [helpdesk@doane.edu](mailto:helpdesk@doane.edu)  
Web: <http://www.doane.edu>

## **Syllabus Disclaimer**

The instructor views the course syllabus as an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes face-to-face, via email or in the course site Announcements. Please remember to check your Doane University email and the course site Announcements often.