Course Syllabus

Course Information

BIO 324
Human Physiology
4 credits

Preliminary Class Plan and Topics

Please see the schedule provided in the course.

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 Canvas
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 listed below).

Course Catalog Description

This course covers functional aspects of the human body from the cellular to the organ-system level. Students will learn the major physiology of body systems, including mechanisms and regulation of normal body functions and pathophysiological aspects of disease. Students will analyze data to give meaningful interpretations of the physiological status of the body. Finally, students will gain an appreciation of the intricacy and detail of the human body and the value of collaborative learning

Course Prerequisites

Recommended: 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, 16 th edition

*textbooks integrated into Canvas

Course Lab

As this is a 4-credit course, you can expect to complete several labs to fulfill the course requirements.

Objectives/Topic for each weekly lab:
Module 1 - pH lab
Module 4 - Muscle excitation/contraction lab
Module 5 - Endocrine lab
Module 6 - Circulatory lab
Module 8 - Fluid movement and pH control lab

Estimated time per lab: You should expect to spend 1.5 - 2 hours per lab

Learning Objectives

Consider including your Course Crux Module/Course Objective alignment chart.

Course Objectives:	**Aligned Weekly Objectives:**
1. **Identify how physiological parameters are regulated through reflex pathways (homeostatic mechanisms)**	**Week 1** 1.2 Describe the parts of the homeostatic mechanism and explain how it is used to maintain conditions for life. **Week 2**

	2.3 Identify the function and regulation of enzymes secreted by the digestive organs and glands. 2.4 Explain and diagram reflex pathways for hormonal control of appetite. **Week 3** 3.1 Explain how the skin works with other body systems to maintain homeostasis including the regulation of body temperature and conservation of water. 3.4 Discuss the major functions of bones and how the skeletal system interacts with other body systems to maintain homeostasis. **Week 4** 4.3 Describe how somatic motor and autonomic neurons are able to stimulate effectors in response to stimulus. **Week 5** 5.2 Describe a simple endocrine pathway in which the response is a negative feedback signal. 5.3 Describe the various signals that initiate hormone production and secretion. **Week 6** 6.1 Define hemostasis and explain the local and reflex control mechanisms that help to achieve it. 6.6 Explain how heart rate (HR) and stroke volume (SV) contribute to cardiac output (CO)

	and are regulated by the autonomic nervous system and by physical properties of the heart. 6.7 Explain how blood pressure is produced and controlled through local and reflex control pathways. **Week 7** 7.4 Locate the respiratory areas within the central nervous system and explain control of normal breathing. **Week 8** 8.6 Explain how chemical buffer systems, the respiratory center and the kidneys keep the pH of body fluids relatively constant.
2. Determine and diagram information flow at cellular (intra AND inter) and organismal levels.	**Week 1** 1.5 Explain and diagram how substances are transported between cellular compartments and across the plasma membrane using active and passive processes. **Week 2** 2.5 List the major sources and cellular uses of carbohydrates, lipids and proteins. **Week 4** 4.5 Describe the difference between graded potentials and action potentials and the events leading to the generation and conduction of an action potential. 4.6 Explain how information passes from a presynaptic neuron to a postsynaptic cell.

	4.7 Describe how membrane potential changes stimulated by excitatory and inhibitory neurotransmitters affect membrane potential in the trigger zone 4.8 Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system to include neuronal arrangement, neurotransmitters used, and effects on target tissues. **Week 5** 5.1 Explain the responses that are stimulated in target cells by steroid and nonsteroid hormones and the production, storage, and transportation differences noted between the classes of hormones. **Week 6** 6.4 Contrast the initiation of action potentials in cardiac autorhythmic cells, in cardiac contractile cells, and in skeletal muscle cells.
3. Describe expected organ system function and how separate organ systems interact to respond to complex changes in internal and external environment.	**Week 1** 1.1 List and describe the major requirements of organisms to maintain life. 1.3 Explain the pH scale and the function of buffers in resisting pH change. 1.4 List the major groups of inorganic chemicals and organic molecules common in cells and explain the function(s) of each group. **Week 2**

	2.1 Describe the process and control of metabolic reactions. 2.2 Explain the processes cells use to store chemical energy and how that energy is used to mediate work in the cell. 2.7 Explain the factors that affect an individual's energy requirements. **Week 3** 3.3 Describe the mechanisms of bone growth, repair, and remodeling. 3.5 Describe and diagram the mechanism of skeletal muscle contraction including neural control, major events and energy sources. 3.6 Describe how a muscle may become fatigued and how oxygen debt may play a role. 3.7 Compare ATP energy production in type I and type II muscle fibers and describe how that affects the functional differences between them. 3.8 Compare the contraction mechanisms of skeletal, cardiac and smooth muscle fibers. **Week 4** 4.1 Describe the nervous system as a control system with the following components: sensory receptors, afferent pathways, control (integrating) center, efferent pathways, and effector (target) organs. 4.2 Describe the structure and function of 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. 4.4 Describe the physiological basis of the resting membrane potential (RMP) in a neuron including the ion channels involved, the relative ion concentrations, and the electrochemical gradient. **Week 5** 5.4 For each of the major endocrine glands, identify the hormones they secrete, how hormone secretion is regulated, and actions of the individual hormones. 5.6 Explain how hormones control the activities of the male reproductive organs and the development of male secondary sex characteristics. 5.7 Explain how hormones control the activities of the female reproductive organs and the development of female secondary sex characteristics. **Week 6** 6.2 Describe the cardiac cycle and explain how heart sounds are produced. 6.3 Identify the parts of a normal ECG pattern and discuss the significance of this pattern. 6.5 Compare and contrast the molecular events of cardiac muscle contraction/relaxation and skeletal muscle contraction/relaxation.

	6.8 Describe the pulmonary and systemic circuits of the cardiovascular system and explain the functional significance of each. 6.10 Describe how tissue fluid and lymph form, and explain the function of lymph. **Week 7** 7.1 Describe the processes associated with the respiratory system (i.e. ventilation, gas exchange, gas transport in the blood) and explain why respiration is necessary for cellular survival. 7.2 Describe and determine values for each of the respiratory air volumes and capacities (inspiratory reserve volume, tidal volume, expiratory reserve volume, residual volume, inspiratory capacity, functional residual capacity, vital capacity, and total lung capacity). 7.3 Show how minute ventilation and alveolar ventilation rate are calculated. 7.5 Describe the structure and function of the respiratory membrane. 7.6 Explain the importance of partial pressure in diffusion of gases in both air and liquid states. 7.7 Explain how the blood transports oxygen and carbon dioxide. 7.8 Describe gas exchange in the pulmonary and systemic circuits. **Week 8** 8.1 Describe the three processes that take place in the nephron (i.e. filtration, reabsorption, and

	secretion) and explain how the integration of these three processes determines the volume and composition of urine. 8.2 Identify the characteristics of a countercurrent mechanism and explain its role in concentrating the urine. 8.3 Explain the importance of maintaining a consistent balance of water and electrolytes within the body, and discuss how fluid and electrolyte balance are interdependent. 8.4 Describe how body fluids are distributed between compartments, how fluid composition varies between them, and how fluids move from one compartment to another under the force of hydrostatic and osmotic pressure. 8.5 List the routes by which water and electrolytes enter and leave the body and the regulation of both processes.
4. Hypothesize physiological changes when presented with injury or pathological structural change, or when presented with hypothetical physical environment conditions.	**Week 2** 2.6 Identify examples of positive and negative nitrogen balance and predict physiological effects of either condition. 2.8 Given a factor or situations (e.g. surgical removal of part of the stomach) predict the changes that could occur in the digestive system and the consequences of those changes on digestive system function. **Week 3**

	3.2 Given a factor or situation (e.g. second-degree burns) predict the changes that could occur within the function of the integumentary system. 3.9 Given a factor or situation (e.g. muscular dystrophy) predict the changes that could occur in muscular system function. **Week 4** 4.9 Given a factor or situation (e.g. a demyelinating disease), predict the changes that would occur in nervous system function. **Week 5** 5.5 Hypothesize functional deficits within the body if there were an imbalance with any single hormone. **Week 6** 6.9 Given a factor or situation (e.g. left ventricular failure) predict the changes that could occur in the cardiovascular system and the change in cardiovascular system function. **Week 7** 7.9 Given a factor or situation (e.g. pulmonary fibrosis) predict the changes that could occur in the respiratory system and the consequences of those changes on respiratory system function. **Week 8** 8.7 Describe the consequences and causes of increase or decrease in body fluid pH. 8.8 Given a factor or situation (e.g. hyperglycemia) predict the changes that could

	occur in the urinary system and the consequences of those changes in urinary system function.

Course Requirements

Online Course
This is an online asynchronous course and there will not be any face-to-face class sessions. All assignments and course interactions will utilize internet technologies. You must have a reliable internet connection throughout the duration of the course.

This course uses Canvas for the facilitation of communication between faculty and students, submission of assignments, and posting of grades. The Canvas Course Site can be accessed at https://doane.instructure.com

Attendance in an online course means logging into the Canvas on a regular basis and participating in all of the activities that are posted in the course. In addition, check your Doane University email account regularly, as your instructor may send important information via email.

Attendance/Participation
Doane University expects active participation by a student in a course, whether the course is on-ground or online. A student is expected to be prompt and regularly attend on-ground classes in their entirety. Regular engagement is expected for online courses.

You should plan to work on this course every day. This is a condensed, fast-paced, course. Expect to spend approximately 18 hours a week preparing for and actively participating in this 8-week course.

Class Preparation
Preparation for class means reading the assigned readings and reviewing all information required for that week.

Computer Requirements
For the successful use of Canvas please refer to Doane University's minimum computer requirements. This also includes:

- Reliable computer and internet connection
- A web browser (Chrome or Mozilla Firefox)
- Adobe Acrobat Reader (free)
- Word processing software—Microsoft Word or Google Docs
- Webcam and mic

Campus Network or Canvas Outage
When access to Canvas 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 by 11:59pm CST.

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.

Federal requirements state that students must complete 75% of the course work to be eligible to receive an incomplete for the course. If students fall more than two weeks behind, they cannot meet this requirement.

Academic Integrity
Fundamental to our mission, our core values, and our reputation, Doane University adheres to high academic standards. Students of Doane University are expected to conduct themselves in a manner reflecting personal and professional integrity. Disciplinary actions may be taken against students whose academic behavior is not congruent with the expectations of the University. Students are responsible for adhering to the standards detailed in this policy. Not being familiar with these standards does not mean that the students will not be accountable for adherence to them. Additional details on the Academic Integrity policy for violating academic integrity are published in the undergraduate and graduate catalogs.

http://catalog.doane.edu/content.php?catoid=18&navoid=1448#Academic_Dishonesty

Course Grading

Submitting Assignments
All assignments, unless otherwise announced by the instructor, must be submitted via Canvas. Each assignment will have a designated place to submit the assignment. All material, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor and review the course site regularly to learn about changes to assignments or due dates.

Grading Scale
Assignment of letter grades is based on a percentage of points earned.All course requirements must be completed before a grade is assigned.

Your grade will be based on the following weighted categories:
Science Communication - 20%
Short answer concept tests - 20%
Labs - 15%
Reading quizzes - 15%
Study guides - 15%
Concept maps - 10%
Final - 5%

Late or Missed Assignments
All assignments must be completed and turned in to finish the course. Unless you discuss a late assignment with your instructor prior to the assignment due date, your assignment will lose 20% each day it is late.

Students are required to complete 75% of the course material in order to receive credit for the course. If students fall more than two weeks behind, they cannot meet this requirement and will receive a withdrawal (W) for the course if this occurs within the first four weeks of the course. If this happens after the fourth week students will receive an F for the course.

Feedback
Please allow 1-3 days for feedback on assignments. Please review instructor feedback for assignments and assessments, this will help you reflect on what you have learned while receiving suggestions for improvement.

Technical Support

If you are in need of technical assistance please access the Self Service Portal. You may reach the help desk at 402-826-8411 or by email at helpdesk@doane.edu.

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 student transitions from high schools and community colleges, conduct in-service training for faculty and staff, enable the resolution of accessibility issues, conduct community outreach, and facilitate collaboration among Doane University staff on disability policies, procedures, and accommodations.

Disability Services

Doane University's Disability Services Office will provide guidance on accommodations and universal access. To request accommodations please complete the Self-Identification Form and visit the website for additional information.

Academic Support

Doane offers a range of academic support services for students.

For students taking courses online or for our Non-Residential students:
https://www.doane.edu/graduate-and-adult/academic-support

For students taking courses on our Crete campus:
https://www.doane.edu/students/resources/academic-support

Title IX Requirements: Mandatory Reporting

At Doane, all university employees, including faculty, are considered Mandatory Reporters. As a Mandatory Reporter, I am required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator and, thus, cannot guarantee confidentiality. This means that if you tell me about an incident of sexual harassment, sexual assault, domestic violence, dating violence, stalking and/or other forms of prohibited discrimination, I have to share the information with the University's Title IX Coordinator. My report does not mean that you are officially reporting the incident. This process is in place to ensure you have access to and are able to receive the support and resources you need. For additional information, including confidential resources, please visit the Campus Advocacy, Prevention, and Education (CAPE) Project.

Instructional Technology Accessibility and Privacy Policies

If your course uses additional technology tools, information on the technology's accessibility and privacy is available on our website.

Syllabus Disclaimer

The instructor and Doane University 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 via email or in the course site Announcements. Please remember to check your Doane University email and the course site Announcements often.

Doane Syllabus Addendum

Each student is responsible for being aware of the policies, resources, and expectations as specified in the Doane Syllabus Addendum located at:
https://www.doane.edu/Syllabus