

## BIME 6006

### HUMAN PHYSIOLOGY FOR BIOENGINEERS Spring 2018

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**CLASS DAYS and TIME:** Tuesday and Thursday, 8:30am – 9:45am, January 9 – June 14

**CLASSROOM:** Academic Learning and Teaching Center (AL&TC) 2.211

**Course Director:** **Jean C. Bopassa, M.S., Ph.D.**

Asst. Professor, Dept. of Cell. & Integrative Physiology

Office: 3.035V Med Sch. Bldg.

UT Health SA

Office Hours: By appointment

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**Course Instructor:** **Carie R. Boychuk, Ph.D.**

Asst. Professor, Dept. of Cell. & Integrative Physiology

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Office Hours: By appointment

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**Course Instructor:** **Jeffrey A. Boychuk, Ph.D.**

Asst. Professor – Research, Dept. of Cell. & Integrative Physiology

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**Course Instructor:** **Martin Paukert, M.D.**

Asst. Professor, Dept. of Cell. & Integrative Physiology

UT Health SA

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**Teaching Assistant:** **Ngoni Madungwe, B.S.**

Ph.D. Candidate in Biomedical Engineering

UT Health SA/UTSA Joint Graduate Program in BME

Office Hours: By appointment

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**Course Description:** The objective of this course is to introduce students to human physiology with emphasis on physical principles, guiding rules, and quantitative approaches. The course will focus on cellular function and physiological processes as applied to human systems including cardiovascular, respiratory, musculoskeletal, nervous, digestive, renal, reproductive and endocrine systems.

**Required/Recommended Textbooks:** Lecture slides

**Time & Location:** 8:30 a.m. – 9:45 a.m. T/R; AL&TC 2.211

**Grading scale:** Letter, A (90-100), B (80-89), C (70-79), D (60-69), F (<60)

**Semester Credit Hours:** 3 Credit Hours

**Clock/Contact Hours:** Lecture (40 hrs); Exams (4 hrs)

**Total clock/contact:** 44 hrs

**Prerequisites:** Undergraduate Biology or equivalent

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**READ THIS DOCUMENT CAREFULLY - YOU ARE RESPONSIBLE FOR ITS CONTENTS.**

## **COURSE DESCRIPTION AND OBJECTIVES**

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By the end of this course, each student should be able to:

- Understand the basic concepts of human physiology.

## **COURSE ORGANIZATION**

**The main teaching modalities used in this course include:**

- 1) Didactic lectures designed to convey information to the students in traditional lecture format
- 2) In-class discussion on specific topics.

**Computer Access** – Students may need access to a computer and the internet to obtain course materials if applicable.

**Reading Assignments** – Reading assignments may be provided during the lecture.

## **ATTENDANCE**

Attendance is mandatory. Students are expected to attend all classes and to be on time. In cases of illness or other serious event, the student is responsible for all materials presented on that day. There will be no make-ups for missed lectures.

## **REQUESTS FOR ACCOMMODATIONS FOR DISABILITIES**

In accordance with policy 4.2.3, **Request for Accommodation Under the ADA and the ADA Amendments Act of 2008 (ADAAA)**, any student requesting accommodation must submit the appropriate request for accommodation under the American with Disabilities Act (ADA, form 100) to his/her appropriate Associate Dean of their School and a copy to the ADA Coordinator. Additional information may be obtained at <http://uthscsa.edu/eo/request.asp>.

## **ACADEMIC INTEGRITY AND PROFESSIONALISM**

Any student who commits an act of academic dishonesty is subject to discipline as prescribed by the UT System Rules and Regulations of the Board of Regents. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, signing attendance sheets for another student, and any

act designed to give unfair advantage to a student or the attempt to commit such an act. Additional information may be obtained at

<http://catalog.uthscsa.edu/generalinformation/generalacademicpolicies/academicdishonestypolicy/>

## **TITLE IX AT UT Health SA**

### **Title IX Defined:**

Title of the Education Amendments of 1972 is a federal law that prohibits sex discrimination in education. It reads “no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

### **UT Health San Antonio’s Commitment:**

UT Health San Antonio is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. As required by Title IX, UT Health San Antonio does not discriminate on the basis of sex in its education programs and activities, and it encourages any student, faculty, or staff member who thinks that he or she has been subjected to sex discrimination, sexual harassment (including sexual violence) or sexual misconduct to immediately report the incident to the Title IX Director.

In an emergency, victims of sexual abuse should call 911. For non-emergencies, they may contact UPD at 210-567-2800. Additional information may be obtained at <http://students.uthscsa.edu/titleix/>

## **EMAIL POLICY**

All course communication will be conducted by e-mail using the student’s LiveMail account. Students are expected to check their e-mail accounts regularly and are responsible for materials, assignments, notifications, and test materials distributed by e-mail.

## **USE OF RECORDING DEVICES**

The use of recording devices is allowed.

## **ELECTRONIC DEVICES**

Cell phones may not be used in class and must be shut off during class. Laptops or tablets can be used in class for class—related purposes and note taking. They may not be used for e-mail, web surfing, or any activity not related to class.

## BIME 6006 Human Physiology for Bioengineers

| <b>Date</b>                | <b>Topic</b>  | <b>Lecturer</b> |
|----------------------------|---|-----------------|
| Jan 9, 2018                | Homeostasis   | Dr. Bopassa     |
| Jan 11, 2018               | Cell Structure  | Dr. Boychuk C.  |
| Jan 16, 2018               | Genetic Code  | Madungwe        |
| Jan 18, 2018               | Proteins & Enzymes  | Madungwe        |
| Jan 23, 2018               | Biochemistry & Metabolic Pathways                           | Dr. Bopassa     |
| Jan 25, 2018               | Diffusion & Movement Across Membranes                       | Dr. Boychuk J.  |
| Jan 30, 2018               | Body Fluid Compartments                                     | Dr. Bopassa     |
| Feb 1, 2018                | Signal Transduction & Control of Cellular Function          | Dr. Boychuk J.  |
| Feb 6, 2018                | <i>Review for Exam 1</i>                                    | Dr. Bopassa     |
| <b>Feb 8, 2018</b>         | <b>EXAM 1</b>   | Dr. Bopassa     |
| Feb 13, 2018               | Bioelectricity  | Dr. Paukert     |
| Feb 15, 2018               | Central & Peripheral Nervous System                         | Dr. Paukert     |
| Feb 20, 2018               | Sensory Physiology  | Dr. Paukert     |
| Feb 22, 2018               | Skeletal Muscle   | Dr. Bopassa     |
| Feb 27, 2018               | Somatic Nervous System                                      | Dr. Boychuk J.  |
| Mar 1, 2018                | Smooth & Cardiac Muscle                                     | Dr. Bopassa     |
| Mar 6, 2018                | Autonomous Nervous System                                   | Dr. Boychuk C.  |
| Mar 8, 2018                | <i>Review for Exam 2</i>                                    | Dr. Bopassa     |
| <b>Mar 13&amp;15, 2018</b> | <b>Spring Break – No Class</b>                              |                 |
| <b>Mar 20, 2018</b>        | <b>EXAM 2</b>   | Dr. Bopassa     |
| Mar 22, 2018               | Blood   | Dr. Bopassa     |
| Mar 27, 2018               | Circulatory System & the Heart                              | Dr. Bopassa     |
| Mar 29, 2018               | The Heart as a Pump   | Dr. Bopassa     |
| Apr 3, 2018                | Vascular & Lymphatic Systems                                | Dr. Bopassa     |
| Apr 5, 2018                | Regulation of Blood Pressure                                | Dr. Bopassa     |
| Apr 10, 2018               | Filtration & the Renal Corpuscle                            | Dr. Bopassa     |
| Apr 12, 2018               | Transport & the Renal Tubule                                | Dr. Bopassa     |
| Apr 17, 2018               | The Kidney as a Selective Filter                            | Dr. Bopassa     |
| Apr 19, 2018               | Concentrating Urine   | Madungwe        |
| Apr 24, 2018               | K, Ca, Mg, Pi & Micturition                                 | Madungwe        |
| Apr 26, 2018               | <i>Review for Exam 3</i>                                    | Dr. Bopassa     |
| <b>May 1, 2018</b>         | <b>EXAM 3</b>   | Dr. Bopassa     |
| May 3, 2018                | Respiratory System & Gas Exchange                           | Dr. Paukert     |
| May 8, 2018                | The Lungs as a Pump   | Dr. Paukert     |
| May 10, 2018               | Control of Respiration                                      | Dr. Paukert     |
| May 15, 2018               | Acid Base Balance   | Dr. Paukert     |
| May 17, 2018               | Endocrine System  | Dr. Bopassa     |
| May 22, 2018               | Hypothalamic-Pituitary Axis                                 | Dr. Boychuk C.  |
| May 24, 2018               | Sex Determination & Male Reproductive System                | Dr. Bopassa     |
| May 29, 2018               | Female Reproductive System                                  | Dr. Bopassa     |
| May 31, 2018               | Digestive System  | Dr. Boychuk C.  |
| Jun 5, 2018                | Enteric Nervous System & Regulation of the Digestive System | Dr. Boychuk C.  |
| Jun 7, 2018                | Immune System & Body Defense                                | Dr. Boychuk J.  |
| Jun 12, 2018               | <i>Review for Exam 4</i>                                    | Dr. Bopassa     |
| <b>Jun 14, 2018</b>        | <b>EXAM 4</b>   | Dr. Bopassa     |