

Boonslick Technical Education Center
PLTW Principles of Biomedical Science Course Syllabus
2018-2019

Instructor: Mrs. Michelle Stock RN BSN

Office Hours: 5th period

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Course Description:

This course will deal with the structure and function of human organ systems. This includes the study of cells, tissues, and the integumentary, skeletal, muscular and nervous systems. Principles of Biomedical Science is a one-credit course. Students completing the entire year will receive 1.0 credit of a science or practical art credit. This is a dual credit course. See below for requirements to obtain college credit. The course will introduce the process of scientific research in fields such as basic biology, human physiology, and medicine. The main goals of the course are to teach students how to think scientifically about problems, design logical experiments to test hypotheses, and effectively communicate their findings to others.

Course Objectives:

Students explore concepts of biology and medicine. Students perform activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems. The course is organized about specific diseases that allow the introduction of basic information on biochemistry and physiology as appropriate. Communication is emphasized and the preparation of charts, PowerPoint presentations, or written and oral reports are required in each Unit. Work in groups is emphasized. Experimental design is incorporated into each Unit.

Dual Credit: *BIO SCI 1943 Introduction to Human Anatomy and Physiology I (LEC 3.0)*

Dual credit can be obtained from Missouri S&T by completing the Principles of Biomedical Sciences curriculum offered by Project Lead the Way in an accredited program. An "A" or "B" grade is required as well as a stanine score of 6 or higher on the end-of-course exam. Missouri S&T trains teachers in this curriculum and performs program certifications.

Course/Curriculum Outline:

Major exercises, activities and learning objects are indicated:

1. Crime Scene

- a. Crime scene investigation techniques
- b. Concept mapping

2. Heart Disease

- a. Heart structure; dissection (sheep heart)
- b. Cardiac function; measure blood pressure, heart rate and EKG (collect and analyze data)
- c. Autonomic regulation of the heart
- d. Blood as a tissue; composition and origin

3. Diabetes

- a. Nutritional requirements
- b. Biological chemistry; chemical bonds; molecular models
- c. Biological macromolecules; build models of carbohydrates, proteins and lipids
- d. Energy metabolism; calorimetry
- e. Homeostatic regulation
- f. Insulin
- g. Enzymes; Lock and Key model; Induced fit model; co-enzymes

4. Sickle Cell Disease

- a. Epidemiology
- b. Oxygen transport
- c. Chromosome and the chemical organization information molecules
- d. General genetics introduction; pedigree charts
- e. DNA structure (model building)
- f. Genetic code; mutations; exons; introns; splicing
- g. Proteins structure
- h. Karyotypes

5. Hypercholesterolemia

- a. Cholesterol; HDL; LDL
- b. Molecular Biological techniques: DNA amplification by polymerase chain reaction; restriction fragment length polymorphism; DNA separation by gel electrophoresis

6. Infectious Disease

- a. Microbiology: bacteria and viruses
- b. Gram staining; microscopy
- c. Antibiotic effectiveness
- d. Virus model

7. Medical Interventions

- a. Pharmacology
- b. Biomedical engineering
- c. Drug development

Textbook and Resource Materials:

This course does not follow a textbook. Students will also use other print and internet resources as part of their course work. **Access to the internet is critical to complete this course. If students do not have internet access at home, they must be willing to access school internet during lunch, before or after school. Student must have, and will be expected to bring to class daily:**

- Blue or black pens
- 2" 3 ring binder dedicated to PBS
- Laboratory notebook

Grading Scale:

The grading scale is as follows:

95-100% A

90-94% A-

87-89% B+

83-86% B

80-82% B-

77-79% C+

73-76% C

70-72% C-

67-69% D+

63-66% D

60-62% D-

Below 60% F

Excused (Parent Excused, Excused, Medical, Field Trips) and Verified Absences:

- All missed work may be made up at full credit.
- It is the student's responsibility to initiate contact with the teacher to get make-up work.
- Work must be completed in a timely fashion, within the same number of days as the days absent (e.g. absent 2 days, work made up in 2 days).
- Participation points may be lost due to absence.

Academic Integrity:

Due to the nature and safety of the various technical fields represented within the classroom instruction, it is imperative to instill within oneself a high degree of academic integrity for the safety of oneself and those nearby. The director and the instructors take cheating very seriously. Students – please remember that your instructors will often be contacted to recommend you for scholarships or employment.

Career and Technical Student Organization HOSA:

As part of the course, students will participate in HOSA: Future Health Professionals. This will allow students to participate in contests related to biotechnology, lab techniques and other medical areas, and participate in career and leadership training. Participating in HOSA on the state level is strongly recommended as an important part of the overall PBS course experience. The fee for HOSA is \$25, which includes a t-shirt.