# Human Body Systems Course No. 14102 Credit: 1.0

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| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes:Biomedical (14.0501)

Course Description: **Technical Level:** In Human Body Systems, students engage in the study of the processes, structures, and interactions of the human body. Important concepts in the course include communication, transport of substances, locomotion, metabolic processes, defense, and protection. Students design experiments, investigate the structures and functions of body systems, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary actions, and respiratory operation.
**\*At the completion of this course, students take the PLTW end-of-course assessment.**

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Describe how multiple body systems are interconnected and how those interconnections and interactions are necessary for life. |  |
| 1.2 | Describe the differences in the appearance of epithelial and connective tissue. |  |
| 1.3 | Explain the basic structure and function of the skeletal system. |  |
| 1.4 | Describe how bone markings, bone landmarks and bone measurements can provide information about gender, race, ethnicity and height of a missing person. |  |
| 1.5 | Describe how the structure of DNA is linked to function in the body. |  |
| 1.6 | Explain how restriction enzymes cut DNA. |  |
| 1.7 | Define Biometrics. |  |
| 1.8 | Identify how gel electrophoresis results can help solve a missing persons’ case. |  |
| 1.9 | Explain how restriction enzymes cut DNA. |  |
| 1.10 | Outline the structure and function of the central nervous system. |  |
| 1.11 | Summarize the techniques scientists use to map brain function. |  |
| 1.12 | Correctly predict how electrical signals are created and transmitted in the human body. |  |
| 1.13 | Summarize the roles of ions in creating electrical impulses in the human body. |  |
| 1.14 | Explain how neurotransmitters help propagate electrical impulses. |  |
| 1.15 | Describe the way in which hormones interact with target cells. |  |
| 1.16 | Differentiate between endocrine and exocrine glands as well as protein/peptide and steroid hormones. |  |
| 1.17 | Illustrate how the structure of the eye focuses light on the retina. |  |
| 1.18 | Describe how the eye and the brain work together to allow a person to see. |  |
| 1.19 | Explain visual perception, including visual acuity, depth perception, peripheral vision, color vision.  |  |
| 1.20 | Predict how long the body can function in the absence of water, food or oxygen. |  |
| 1.21 | List and describe the human body systems that create, process and distribute food, water and oxygen. |  |
| 1.22 | Deduce the factors, both environmental and personal that can impact the body’s ability to survive with limited fuel. |  |
| 1.23 | Describe the structure and function of the organs in the digestive system. |  |
| 1.24 | Explain how energy is stored in ATP and how energy is released from ATP. |  |
| 1.25 | Infer how the calories consumed in daily diet versus the calories expended in daily activities affects overall health. |  |

## Benchmark 2: Structures and functions of the body

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Describe the structure of the respiratory system, especially the lungs, and the basic mechanics of breathing. |  |
| 2.2 | Illustrate how the structure of the lungs facilitates the exchange of oxygen and carbon dioxide between air and the body. |  |
| 2.3 | Analyze the process through which the respiratory and cardiovascular systems facilities the transport of oxygen to all cells in the body. |  |
| 2.4 | Describe the structure and function of the human urinary system. |  |
| 2.5 | Describe how the structure of the kidney relates to its function in the body. |  |
| 2.6 | Illustrate the composition of normal blood and normal urine. |  |
| 2.7 | Explain how the body uses hormones to maintain a water balance. |  |
| 2.8 | Describe how the types of joints found in the human body differ in both structure and function. |  |

## Benchmark 3: Understand terms and concepts for nerve and muscle systems

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Demonstrate the meaning of terms that describe the motion at joints, such as flexion and extension. |  |
| 3.2 | Describe the requirements for muscle contraction. |  |
| 3.3 | Illustrate the connection between nerves and muscles. |  |

## Benchmark 4: Understand terms and concepts of the circulatory system.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Explain the relationship between the heart and the lungs and trace the path of major circulatory routes. |  |
| 4.2 | Define pulse and blood pressure and name and locate several pulse points on the body. |  |
| 4.3 | Identify the body’s major arteries and veins and name the body region supplied by each. |  |
| 4.4 | Describe the ways in which the human body can generate ATP as well as how long the energy will last in each case. |  |
| 4.5 | Describe the structure and function of the lymphatic and immune system. |  |
| 4.6 | Describe the interaction between antigens and antibodies. |  |
| 4.7 | Explain how the systems work together to maintain homeostasis in the body and to complete basic functions such as movement and communication. |  |

## Benchmark 5: Understand terms and concepts about skin and bone in the human body.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Describe the structure and function of human skin. |  |
| 5.2 | Explain how different degrees of burns damage layers of the skin. |  |
| 5.3 | Describe how the human body senses and processes signals of pain. |  |
| 5.4 | Compare the structure and function of compact and spongy bone. |  |
| 5.5 | Describe the types of bone fractures. |  |
| 5.6 | Outline what happens to bone structure as we age. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

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