

## WTCS Repository

# 10-806-179 Adv Anatomy & Physiology

## Course Outcome Summary

### Course Information

**Description** Advanced Anatomy and Physiology is the second semester in a two-semester sequence in which normal human anatomy and physiology are studied using a body systems approach with emphasis on the interrelationships between form and function at the gross and microscopic levels of organization. Instructional delivery within a classroom and laboratory setting. Experimentation within a science lab will include analysis of cellular metabolism, the individual components of body systems such as the nervous, neuromuscular, cardiovascular, and urinary. Continued examination of homeostatic mechanisms and their relationship to fluid, electrolyte, acid-base balance and blood. Integration of genetics to human reproduction and development are also included in this course.

**Total Credits** 4.00

### Pre/Corequisites

**Prerequisite** Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

### Course Competencies

#### 1. Analyze how the individual components of the nervous system work as an integrated whole

##### Assessment Strategies

- 1.1. through a written, graphic or oral product or process
- 1.2. in a laboratory or classroom setting

##### Criteria

*Performance will be successful when:*

- 1.1. written, graphic or oral product or process examines sensory function
- 1.2. written, graphic or oral product or process examines motor and sensory neural pathways
- 1.3. written, graphic or oral product or process describes the role of the autonomic nervous system in maintaining homeostasis
- 1.4. written, graphic or oral product or process describes neuro-physiology including potential generation, impulse conduction and synaptic transmission
- 1.5. written, graphic or oral product or process evaluates the actions of neurotransmitters

#### 2. Analyze how the individual components of the endocrine system work as an integrated whole

##### Assessment Strategies

- 2.1. through a written, graphic or oral product or process
- 2.2. in a laboratory or classroom setting

## Criteria

*Your performance will be successful when:*

- 2.1. written, graphic or oral product or process relates endocrine function to homeostasis, including hypo- and hypersecretion
- 2.2. written, graphic or oral product or process identifies the advanced mechanisms of hormone actions
- 2.3. written, graphic or oral product or process identifies the mechanism of hormone transport
- 2.4. written, graphic or oral product or process correlates the relationship of neural function and hormonal secretion
- 2.5. written, graphic or oral product or process correlates the major hormones to the tissues and organs that secrete them
- 2.6. written, graphic or oral product or process correlates the major hormones to their respective target tissues
- 2.7. written, graphic or oral product or process explains control of hormone secretion
- 2.8. written, graphic or oral product or process describes hormonal response to stress

### 3. Analyze the processes of cellular metabolism

#### Assessment Strategies

- 3.1. through a written, graphic or oral product or process
- 3.2. in a laboratory or classroom setting

#### Criteria

*Performance will be successful when:*

- 3.1. written, graphic or oral product or process compares the processes of aerobic and anaerobic respiration
- 3.2. written, graphic or oral product or process distinguishes between anabolism and catabolism
- 3.3. written, graphic or oral product or process compares the mechanism of carbohydrate, lipid and protein metabolism
- 3.4. written, graphic or oral product or process correlates appropriate cellular organelles and transport mechanisms with their roles in cellular metabolism

### 4. Correlate muscle physiology to normal body function

#### Assessment Strategies

- 4.1. through a written, graphic or oral product or process
- 4.2. in a laboratory or classroom setting

#### Criteria

*Performance will be successful when:*

- 4.1. written, graphic or oral product or process identifies the microscopic anatomy of the muscle fiber
- 4.2. written, graphic or oral product or process identifies the physiology of muscle contraction
- 4.3. written, graphic or oral product or process explains the physiology involved in myoneural junctions
- 4.4. written, graphic or oral product or process explains energy production, storage and consumption in the muscle cell

### 5. Analyze the roles of DNA and RNA in controlling cell function and genetics

#### Assessment Strategies

- 5.1. through a written, graphic or oral product or process
- 5.2. in a laboratory or classroom setting

#### Criteria

*Performance will be successful when:*

- 5.1. written, graphic or oral product or process describes DNA replication
- 5.2. written, graphic or oral product or process shows relationship to enzyme production
- 5.3. written, graphic or oral product or process describes effect of mutations on cell function
- 5.4. written, graphic or oral product or process describes gene regulation
- 5.5. written, graphic or oral product or process contrasts DNA and RNA structures and functions
- 5.6. written, graphic or oral product or process distinguishes among the three types of RNA
- 5.7. written, graphic or oral product or process describes the processes involved in protein synthesis

## **6. Evaluate the components of defense and immunity that support homeostasis**

### **Assessment Strategies**

- 6.1. through a written, graphic or oral product or process
- 6.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 6.1. written, graphic or oral product or process correlates blood components and composition to homeostasis
- 6.2. written, graphic or oral product or process distinguishes among active and passive immunity
- 6.3. written, graphic or oral product or process describes the components of the immune system
- 6.4. written, graphic or oral product or process describes specific and nonspecific immunity

## **7. Analyze cardiovascular physiology to normal body function**

### **Assessment Strategies**

- 7.1. through a written, graphic or oral product or process
- 7.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 7.1. written, graphic or oral product or process examines the conduction system of the heart
- 7.2. written, graphic or oral product or process examines the coronary circulation system
- 7.3. written, graphic or oral product or process examines blood flow dynamics
- 7.4. written, graphic or oral product or process analyzes factors affecting blood pressure
- 7.5. written, graphic or oral product or process relates extrinsic and intrinsic factors that influence cardiac function
- 7.6. written, graphic or oral product or process correlates the cardiac cycle with EKG and blood flow dynamics

## **8. Analyze renal physiology**

### **Assessment Strategies**

- 8.1. through a written, graphic or oral product or process
- 8.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 8.1. written, graphic or oral product or process correlates nephron structure to filtration, re-absorption and secretion
- 8.2. written, graphic or oral product or process analyzes factors affecting urine formation
- 8.3. written, graphic or oral product or process explains the role of the juxtaglomerular apparatus
- 8.4. written, graphic or oral product or process explains the role of the kidney's vascular system in urine formation
- 8.5. written, graphic or oral product or process explains the normal and abnormal constituents of urine and their significance

## **9. Evaluate the roles of different organ systems in maintaining adequate tissue perfusion and oxygenation**

### **Assessment Strategies**

- 9.1. through a written, graphic or oral product or process
- 9.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 9.1. written, graphic or oral product or process explains the mechanisms that influence hemodynamics
- 9.2. written, graphic or oral product or process includes mechanisms responsible for controlled blood flow through tissues
- 9.3. written, graphic or oral product or process includes compensatory mechanisms
- 9.4. written, graphic or oral product or process explains how alterations in blood, pCO<sub>2</sub>, pH, and pO<sub>2</sub> influence ventilation

- 9.5. written, graphic or oral product or process includes the exchange of oxygen and carbon dioxide in the tissues and lungs
- 9.6. written, graphic or oral product or process explains the mechanisms of gas transport

## **10. Distinguish among the processes of digestion, absorption, and assimilation**

### **Assessment Strategies**

- 10.1. through a written, graphic or oral product or process
- 10.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 10.1. written, graphic or oral product or process examines absorption of nutrients
- 10.2. written, graphic or oral product or process examines transport and storage of nutrients
- 10.3. written, graphic or oral product or process examines regulations of digestive processes
- 10.4. written, graphic or oral product or process examines the role of the liver, gall bladder and pancreas in digestive and related metabolic functions

## **11. Correlate fluid, electrolyte and acid-base balance to the homeostatic mechanisms responsible for their control**

### **Assessment Strategies**

- 11.1. through a written, graphic or oral product or process
- 11.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 11.1. written, graphic or oral product or process identifies fluid compartments and the water and solute movement between them
- 11.2. written, graphic or oral product or process describes the mechanisms by which the water and electrolyte content of the body fluid is regulated
- 11.3. written, graphic or oral product or process compares the composition of intracellular and extracellular fluids
- 11.4. written, graphic or oral product or process describes mechanisms for regulating pH
- 11.5. written, graphic or oral product or process describes acidosis, alkalosis, and compensatory mechanisms

## **12. Integrate genetics, development and human reproductive physiology**

### **Assessment Strategies**

- 12.1. through a written, graphic or oral product or process
- 12.2. in a laboratory or classroom setting

### **Criteria**

*Performance will be successful when:*

- 12.1. written, graphic or oral product or process compares mitosis with meiosis
- 12.2. written, graphic or oral product or process distinguishes between spermatogenesis and oogenesis
- 12.3. written, graphic or oral product or process describes the events of fertilization/fetal development
- 12.4. written, graphic or oral product or process recognizes fetal circulation
- 12.5. written, graphic or oral product or process describes the hormonal control of reproductive cycles
- 12.6. written, graphic or oral product or process evaluates the patterns of human inheritance

## **13. Use appropriate scientific laboratory methods and safety precautions**

### **Assessment Strategies**

- 13.1. in the laboratory

### **Criteria**

*Performance will be successful when:*

- 13.1. you identify hazards and safety equipment in the lab
- 13.2. you select appropriate personal protective equipment
- 13.3. you follow all laboratory practice expectations of the college