



Western Technical College

## 10513115 Basic Immunology Concepts

### Course Outcome Summary

#### Course Information

<b>Description</b>	This course provides an overview of the immune system including laboratory testing methods for diagnosis of immune system disorders, viral and bacterial infections.
<b>Career Cluster</b>	Health Science
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	2
<b>Total Hours</b>	54

#### Pre/Corequisites

Prerequisite	10513114 Urinalysis
Pre/Corequisite	Basic Lab Skills
Pre/Corequisite	General Anatomy and Physiology

#### Textbooks

*Clinical Immunology and Serology*. 5th Edition. Copyright 2021. Miller, Linda E. and Christine Dorresteyn Stevens. Publisher: F.A. Davis Company. **ISBN-13**: 978-0-8036-9440-8. Required.

#### Learner Supplies

Lab Coat - \$20. **Vendor**: Campus Shop. Required.

Safety Glasses. **Vendor**: Campus Shop. Required.

Sharpie Permanent Marker. **Vendor**: Campus Shop. Required.

Three-ring binder. **Vendor:** Campus Shop. Required.

## Program Outcomes

1. Practice laboratory safety and regulatory compliance
2. Monitor and evaluate quality control in the laboratory
3. Apply modern clinical methodologies including problem solving and troubleshooting according to predetermined criteria
4. Correlate laboratory results to diagnosis of clinical conditions and/or diseases

## Course Competencies

### 1. Summarize the functions of the immune system

#### Assessment Strategies

- 1.1. Oral, Written and/or Graphic Assessment

#### Criteria

*You will know you are successful when*

- 1.1. you identify the key functions of the innate immune system
- 1.2. you identify the key functions of the acquired immune system
- 1.3. you describe the relationship of one system to the other

#### Learning Objectives

- 1.a. Define immunologic terms.
- 1.b. Breakdown the components of immune response: nonspecific and specific immunity
- 1.c. Identify what constitutes a foreign substance (antigen) within the body
- 1.d. Characterize the cells involved in both nonspecific and specific immunity
- 1.e. Characterize the compounds produced by the various cells involved in immunity
- 1.f. Identify complement activity involved in both innate and specific immunity
- 1.g. Label the component parts of immunoglobulins and the binding areas of antigens, complement and macrophages
- 1.h. Differentiate between the five types of immunoglobulins structurally and functionally
- 1.i. Diagram the interaction between cells and compounds involved in the immune response
- 1.j. Distinguish the types of immunity produced by different antigens
- 1.k. Summarize how immunity develops in the fetus to old age
- 1.l. Summarize the destruction of antigens during immune response

### 2. Characterize testing methodology used in immunodiagnostic testing

#### Assessment Strategies

- 2.1. Oral, Written and/or Graphic Assessment

#### Criteria

*You will know you are successful when*

- 2.1. you explore the following methods: label immunoassays, precipitation, agglutination, flow cytometry-nephelometry, other emerging technologies
- 2.2. you describe the principles of each method
- 2.3. you evaluate appropriate uses of each method
- 2.4. you compare similarities between the types of reactions used in immunodiagnostic testing
- 2.5. you differentiate between the types of reactions used in immunodiagnostic testing

#### Learning Objectives

- 2.a. Define key terms relating to antigen-antibody reactions
- 2.b. Identify factors essential for antigen-antibody reactions

- 2.c. Describe events occurring during the primary and secondary antigen
- 2.d. Differentiate between prozone, zone of equivalence, and post-zone in antigen-antibody reactions
- 2.e. Describe structural characteristics affecting antigen-antibody binding
- 2.f. Describe the impact and importance environmental factors (temperature, ionic strength, hydrogen ion concentrations etc.)
- 2.g. Distinguish between monoclonal and polyclonal antibodies in antigen-antibody reactions
- 2.h. Distinguish what antigen-antibody reactions are more sensitive due to whether it is a primary or secondary manifestation
- 2.i. Distinguish between the types of antigen-antibody reactions (precipitation, agglutination, solid-phase immunoassay, complement-fixation, or neutralization reactions)
- 2.j. Identify laboratory tests that use specific antigen-antibody reactions

### 3. Correlate pathophysiology to immune disorders

#### Assessment Strategies

- 3.1. Oral, Written and/or Graphic Assessment

#### Criteria

*You will know you are successful when*

- 3.1. you describe immune disorders
- 3.2. you explain the etiology of the immune disorder
- 3.3. you explain the epidemiology of the immune disorder
- 3.4. you describe signs, symptoms, and treatments of the immune disorder

#### Learning Objectives

- 3.a. Define immune tolerance.
- 3.b. Describe proposed mechanisms for autoimmunity.
- 3.c. Discuss characteristics of organ-specific and systemic autoimmune diseases including: Systemic Lupus Erythematosus, Rheumatoid Arthritis, Graves' disease, Hashimoto's thyroiditis, Addison's Disease, Type 1 Diabetes mellitus, and Celiac disease.
- 3.d. Describe the characteristics of primary immunodeficiency disorders.
- 3.e. Describe the characteristics of common complement component deficiencies.
- 3.f. Describe the clinical symptoms in phagocyte deficiencies including: chronic granulomatous disease, Chediak-Higashi syndrome, and Job's syndrome.
- 3.g. Describe the clinical symptoms in Acquired Immunodeficiencies including: Acquired B cell deficiency and HIV/AIDS.
- 3.h. Describe the clinical findings in various infectious diseases including: Epstein-Barr infection (infectious mononucleosis), Hepatitis (A, B, C), Rubella, Syphilis, Group A streptococcal infection, and Cytomegalovirus (CMV).

### 4. Correlate lab results to disease states

#### Assessment Strategies

- 4.1. Oral, Written and/or Graphic Assessment

#### Criteria

*You will know you are successful when*

- 4.1. you differentiate between acute and convalescent testing
- 4.2. you evaluate immune status
- 4.3. you select appropriate test sequence for the disease state

#### Learning Objectives

- 4.a. Describe the laboratory findings in Acquired Immunodeficiencies including: Acquired B cell deficiency and HIV/AIDS.
- 4.b. Describe the laboratory findings in phagocyte deficiencies including: chronic granulomatous disease, Chediak-Higashi syndrome, and Job's syndrome.
- 4.c. Describe the laboratory findings for classic autoimmune diseases including: Systemic Lupus Erythematosus, Rheumatoid Arthritis, Graves' disease, Hashimoto's thyroiditis, Addison's Disease, Type 1 Diabetes mellitus, and Celiac disease.
- 4.d. Describe the laboratory findings in various infectious diseases including: Epstein-Barr infection (infectious mononucleosis), Hepatitis (A, B, C), Rubella, Syphilis, Group A streptococcal infection, and Cytomegalovirus (CMV).

## **5. Perform immunodiagnostic testing**

### **Assessment Strategies**

5.1. Oral, Written and/or Skill Assessment

### **Criteria**

*You will know you are successful when*

- 5.1. you follow established procedures for immunodiagnostic testing
- 5.2. you document test results
- 5.3. you correlate results with diagnosis, treatment, and prognosis

### **Learning Objectives**

- 5.a. Prepare appropriate materials, reagents, and equipment for the performance of test procedures.
- 5.b. Perform procedures according to established laboratory protocol and report results.
- 5.c. Determine acceptability of results.
- 5.d. Identify sources of error in test procedures according to laboratory protocol.
- 5.e. Perform and document quality control.