

Biology
220
Immunology
COURSE OUTLINE

Prerequisites:

Prerequisites: BIO 101 or equivalent and BIO 150, BIO 205 or equivalent.

Course Description:

Provides students with an in-depth understanding of the mammalian immune system. Students begin with a detailed study of the immune system components and move on to an integrated look at the immune response with respect to clinical applications and human health.

This course is designed to provide students with an in-depth understanding of the mammalian immune system. The immune system is a complex network of cells, tissues and effector proteins all of which work together in a very elaborate matrix. This course will begin with a detailed study of the many immune system components and then will move on to an integrated look at immune response, which combines concepts in cell biology, genetics, developmental biology and biochemistry. After developing a sound foundation regarding the function of the immune system, we will look at the immune system with respect to clinical applications and human health. We will learn how the immune system can be manipulated or exploited, and even how it can actually fail and accidentally turn on its host.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Course Outcomes

At the completion of this course, the student should be able to:

1. Have a thorough understanding of the history of Immunology and how technological advances have furthered our study of this field;
2. Be able to describe the cellular and molecular components of the innate and acquired immune systems;
3. Understand the generation of diversity as it applies to both humoral and cell-mediated immune responses;
4. Be able to describe the events leading to both humoral and cell-mediated immune responses;
5. Understand how congenital and acquired immune deficiencies affect human health;
6. Understand how the immune system can be modulated to improve human health.

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Semester Credits: 3 Lecture Hours: 3 Lab/Recitation Hours 0

Biology 220

Immunology

Required Materials:

Textbooks:

***The Immune System*, 4th Ed. Peter Parham, Garland Science,
ISBN 978-0-8153- 4146-8**

**Case Studies in Immunology, 6th ed., Fred Rosen, Garland Science,
ISBN 978-0-8153-4441-4**

VIRGINIA WESTERN COMMUNITY COLLEGE
PO Box 14007
Roanoke, VA 24038
(540)-857-7273



Immunology

Topical Description:

- I. Introduction and History
 - A. Smallpox
 - B. Lady Mary Wortley Montague
 - C. Edward Jenner

- II. Elements of the Immune System 1
 - A. Pathogens
 - B. Organs
 - C. Cells
 - a. hematopoiesis

- III. Innate Immunity 2
 - A. Complement
 - B. Toll Like Receptors
 - C. Phagocytosis
 - D. Natural Killer Cells
 - E. Inflammation

- IV. Adaptive Immunity 3
 - A. B cells
 - B. T Cells
 - C. Clonal Selection

- V. Antibody Structure and Diversity 4
 - A. How antibody structure was determined
 - B. Antibody Structure
 - C. Generation of Antibody Diversity before antigen
 - D. Diversification Antibodies Diversity after antigen

- VI. The T cell Receptor 5
 - A. Generation of T cell diversity
 - B. Gamma delta T cells
 - C. Antigen Processing and Presentation
 - D. MHC



VII. The Development of B lymphocytes	6
A. In the bone marrow	
B. Development of the B cell repertoire following antigen	
VIII The Development of T Lymphocytes	7
A. In the thymus	
B. Positive and Negative Selection	
IX. T Cell Immunity	8
A. Activation of T cell with antigen	
a. The dendritic cell	
b. Other antigen presenting cells	
B. Effector Cells	
X. B Cell Immunity	9
A. Antibody Production	
B. Antibody Effector Functions	
XI. The Body's defense	10
A. At the mucosa	
B. Immunologic Memory	
C. Bringing Cell mediated and Humoral Immunity Together	
XII. Immunodeficiencies	11
A. Immune Evasion	
B. Inherited Immunodeficiencies	
C. Acquired Immunodeficiencies	
XIII. Allergies and Hypersensitivity Reactions (if time permits)	12
A. Type I	
B. Type II	
C. Type III	
D. Type IV	
XIV. Autoimmune Diseases (if time permits)	13
XV. Manipulation of the Immune Response (if time permits)	
A. Vaccination	14
B. Transplantations	15



Evaluation Criteria and Procedures

Normally assessment entails three or more written lecture exams as well as reading assignments, oral presentations and an in-depth project on the AIDS epidemic. Each lecture exam contains a peer reviewed journal article that the students must read and answer questions on. Also, students are required to present immunology based case studies during the semester.

Notes to Instructors

1. Departmental policy dictates that instructors do not allow students to keep tests.
2. A comprehensive final exam counting 15% - 20% of the total grade will be given at the end of the semester.
3. Syllabus should state what the course grade will be based on, such as tests, quizzes, a comprehensive final exam, and any other assignments made by the instructor.
4. The VWCC Biology Department uses a 10 point grading scale.

