

RARITAN VALLEY COMMUNITY COLLEGE ACADEMIC COURSE OUTLINE

MLTC 130 Immunology

I. Basic Course Information

- A. Course Number and Title: MLTC 130 Immunology
- B. New or Modified Course: Modified
- C. Date of Proposal: Semester: Fall Year: 2024
- D. Effective Term: Fall 2025
- E. Sponsoring Department: Science & Engineering
- F. Semester Credit Hours: 3 credits
- G. Weekly Contact Hours: 5 Lecture: 2
 Laboratory: 3
 Out of class student work per week: 5.5
- H. Prerequisites: MLTC 100 with a grade of C or higher and BIOL 125 with a grade of C or higher; or permission of the instructor
- I. Laboratory Fees: No

II. Catalog Description

Prerequisites: MLTC 100 with a grade of C or higher and BIOL 125 with a grade of C or higher; or permission of the instructor. This course is an introduction to basic concepts in immunology. It will present the classification, functions and interactions of components of the immune system. Detailed analysis of the development of the immune system, including specific immunoglobulin structure and functions, complement and the major histocompatibility complex, and genetics will be covered. In the lab, theory and practice of serological testing will be introduced with an emphasis on clinical significance and disease correlation. Traditional techniques and molecular methods for detection and confirmation of disease states will also be practiced.

III. Statement of Course Need

- A. Serological testing and analysis is a necessary skill needed for competent MLTs. This course is required for the Medical Laboratory Technology program.
- B. There is a lab component in this course so that the theory can be practiced.
- C. This course generally transfers as a Free Elective, but dependent on the transfer institution it may transfer as a Program Elective to schools that offer a B.S. degree in Clinical Laboratory Science.

IV. Place of Course in College Curriculum

- A. Free Elective
- B. This course meets a program requirement for the Associate of Applied Science degree program in Medical Laboratory Technology
- C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

I. PRINCIPLES OF IMMUNOLOGY

- A. Immune System Physiology
 - 1. Primary and secondary response
 - 2. B and T cells, macrophages
 - 3. Genetics
- B. Immunoglobulins
 - 1. Classes and subclasses
 - 2. Structure
 - 3. Biologic and physical properties
- C. Antigen-Antibody Interactions
 - 1. Principles
 - 2. Testing
 - a. Principles
 - b. Methods
- D. Complement
 - 1. Classical and alternative pathway mechanisms
 - 2. Biologic properties

II. DISEASES OF THE IMMUNE SYSTEM

- A. Autoimmunity
 - 1. Systemic (e.g., SLE)
 - 2. Organ-specific (e.g., Graves disease)
- B. Hypersensitivity
 - 1. I, II, III, IV

- C. Immunoproliferative Diseases
 - 1. Monoclonal gammopathies (e.g., multiple myeloma, Waldenström macroglobulinemia)
- D. Immunodeficiency
 - 1. Hereditary (e.g., SCID)
 - 2. Acquired (e.g., HIV)
- III. TRANSPLANTATION
 - A. Graft-versus-host Disease
 - B. HLA Typing
 - C. Tumor Immunology
- IV. INFECTIOUS DISEASE SEROLOGY
 - A. Clinical Significance and Epidemiology of Viral Pathogens (e.g., hepatitis (A, B, C), EBV, HIV, CMV, rubella, measles)
- V. SEROLOGIC AND MOLECULAR PROCEDURES
 - A. ANA
 - B. Thyroid Antibodies
 - C. Rheumatoid Factor
 - D. Direct Detection Methods for Pathogens
 - E. Labeled Immunoassays (e.g., ELISA)
 - F. Nontreponemal Syphilis Testing (e.g., RPR)
 - G. Treponemal Syphilis Testing (e.g., MHATP)
 - H. Hybridization Techniques
- VI. TEST RESULTS
 - A. Interpretation
 - B. Confirmatory Testing
 - C. Disease State Correlation

VI. A. Course Learning Outcomes:

At the completion of the course, students will be able to:

1. Describe the structure and primary functions of the components of the immune system (-GE 1).
 2. Use appropriate mathematical applications to interpret data (GE-2*).
 3. Perform proper laboratory techniques and demonstrate the correct use of equipment and instruments required in serology (-GE 3).
 4. Perform necessary calculations to prepare correct dilutions or concentrations of reagents for use in serological tests (GE 2, 3).
 5. Explain the clinical significance of serological analysis and their results (GE 1*).
- (*Embedded critical thinking)

6. Compare and contrast the functions and components of the innate and acquired immune systems.
7. Compare and contrast the primary and secondary immune responses.
8. List and describe the anti-microbial molecules produced by the immune system.
9. Describe the role of MHC molecules, T cell subsets, and the five immunoglobulin classes in the adaptive response.
10. Evaluate the significance of multiple laboratory tests in the diagnosis of autoimmune disease.
11. Provide examples of organ-specific autoimmunity resulting from cell-mediated or antibody-mediated pathologies.
12. Discuss appropriate methods to diagnose immunoproliferative or immunodeficiency disorders.
13. Distinguish between acute or chronic disease caused by different viruses on the basis of serology.
14. Describe appropriate serological tests for viral, bacterial and fungal infections.
15. Describe pre- and post-examination procedures of serology.
16. Discuss potential sources of error and troubleshoot common serological assays.
17. Describe quality assessment practices for serology.
18. Develop professionalism, communication skills, and interpersonal relationships by working cooperatively with instructors, preceptors and fellow students

C. Assessment Instruments

1. Exams
2. Assignments
3. Quizzes
4. laboratory products
5. laboratory reports
6. research papers
7. demonstrations
8. essays
9. journals
10. portfolios

VII. Grade Determinants

- A. Exams
- B. Assignments
- C. Quizzes
- D. laboratory reports
- E. research papers

The primary formats, modes, and methods for teaching and learning that may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. computer-assisted instruction
- D. guest speakers
- E. laboratory
- F. student oral presentations
- G. simulation/role playing
- H. student collaboration
- I. independent study

VIII. Texts and Materials

A. Textbooks

Sample of specific text which may be featured:

- Clinical Immunology and Serology. Christine Dorresteyn Stevens and Linda E. Miller, 4th edition.

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

- A. Laboratory
- B. Computers with internet access.
- C. RVCC library databases.

X. Honors Options

An Honors Option is not available for this course.