

# Virginia Western Community College

## MDL 227

### Clinical Immunohematology / Immunology II

**Prerequisites:**

MDL 126 or equivalent.

**Course Description:**

Emphasizes ability to apply theories and procedures utilized in immunohematology for routine transfusion and donor services. Correlates theories with practical application in order to assess cellular and immune mechanisms in specific disease states.

The course is designed to continue instruction for MLT students in immunohematology after having completed the prerequisite course. Instruction will include review of immunology and genetics relating to blood bank, requirements for blood donation and component production, quality control, routine blood bank testing, equipment qualification, use and maintenance, pre-transfusion procedures, red cell antibody identification, transfusion practices and discussion of advanced blood bank theories and techniques. At completion the MLT students should be able to perform routine testing in a blood bank setting.

**Semester Credits: 3    Lecture Hours: 1    Lab/Recitation Hours: 6**

**Required Materials:**

Textbook:

Modern Blood Banking & Transfusion Practice, 7th Edition by Denise M. Harmening, Davis Plus, 2012.

ISBN: 9780803668881

**Course Outcomes:**

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

- Identify an atypical antibody or antibodies in an unknown sample
- List and state the significance of the secondary human blood groups
- Distinguish between warm and cold or clinically significant and insignificant antibodies
- Perform quality assurance as related to blood bank reagents and equipment
- Perform routine blood bank tests to include: ABO/Rh, Antibody Detection, Antibody Identification, Direct Antiglobulin Test, Prenatal Antibody Titration
- Identify, prepare, and store blood products using proper product storage requirements, appropriate product selection, means of transfusion and special handling requirements
- Perform calculations relating to blood bank processes to include: RhIg dosage, total blood volume, corrected platelet count increment (CCI)
- Recognize and troubleshoot unusual test results
- Perform advanced testing concepts and techniques utilized in the blood bank or reference laboratory setting
- Recognize how pre-analytical, analytical, and post analytical errors can adversely affect results

## Topics

### 1. Laboratory Safety

- General Safety Principals
- Blood-Borne Pathogen Safety
- Chemical Safety
- Radiation Safety
- Protection from Physical Hazards

### 2. Fundamental Concepts

- Red Blood Cell and Platelet Preservation: Historical Perspectives and Current Trends

### 3. Overview of the Routine Blood Bank Laboratory

- Organization
- Personnel Requirements
- Standard Operating Procedures
- Transfusion Process Oversight

### 4. Quality and Compliance Issues

- Quality Management
- Equipment Preventative Maintenance/Quality Control, qualification/ validation
- Supply and Reagent receipt, inspection, acceptance testing, QC
- Nonconformance

### 5. Fundamental Concepts

- Basic Genetics / Blood Group Genetics
- Fundamentals of Immunology
- Concepts in Molecular Biology

### 6. Blood Bank Testing Methodologies Overview

- Test tube – reagents, enhancement medias
- Automated methods – Gel, Solid Phase, other
- Overview Advanced Methods –adsorption/ elution, inhibition, chemical treatments

### 7. Blood Groups and Serologic Testing

- The Antiglobulin Test
- The ABO Blood Group System
- The Rh Blood Group System
- Blood Group terminology and Other Blood Groups

### 8. Review of Safety and Quality Management

### 9. Review of MDL 126

- ABO/Rh theory, principles and testing procedures
- DAT theory, principles and testing procedures

**10. Blood Collection**

- Donor selection and qualification - health history questions, physical exam
- Collection type-
- Whole blood veinipuncture
- Apheresis - blood, platelet, plasma
- Special Collections: Autologous, Homologous, and Directed
- Collection Processes

**11. Blood Components**

- Component Production
- Blood Component testing / labeling
- Product Requirements and QC
- Product Storage and Distribution

**12. Antibody Detection and Identification**

- Low incidence antigens
- High incidence antigens
- Antibody Identification
  - Requirements to rule out specificities
  - Requirements to confirm antibody identification
  - Probability (P-value)
- Positive DAT

**13. Transfusion Practices -**

- Pre-transfusion Testing
- Post-Transfusion Testing/ Transfusion Reactions/ Testing for Investigation of transfusion reactions

**14. Blood Group Systems - Characteristics of antigen/ antibody and special testing for antibody identification (if applicable)**

- Lewis /H/I Systems
- Kell System
- Kidd System
- Duffy System
- MNS System
- P System
- Other Blood Group Systems

**15. Advanced Antibody Identification Techniques**

- Adsorption/ Elution
- Chemical Treatments
- Inhibition

**Notes to Instructors:**

MDL 227 continues from the point that MDL 126 ends. Topics 1-7 are usually covered in MDL126 and topics 8-15 in MDL 227.