Virginia Western Community College
MDL 227
Immunohematology II

Prerequisites
MDL 126 Clinical Immunohematology / Immunology I

Course Description
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/Clinical/Internship Hours: 6

Required Materials

Textbook:
Modern Blood Banking & Transfusion Practice, Sixth Edition by Denise M. Harmening Davis Plus, 2012.ISBN:978-0-8036-2682-9

Other Required Materials:

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

Topical Description

Note: Sections I-VII are covered in the first semester course – MDL 126

Immunohematology / Immunology I

I. Laboratory Safety
   A. General Safety Principals
   B. Blood-Borne Pathogen Safety
   C. Chemical Safety
   D. Radiation Safety
   E. Protection from Physical Hazards

II. Fundamental Concepts (Part I)
   A. Red Blood Cell and Platelet Preservation: Historical Perspectives and Current Trends (Chapter 1)

III. Overview of the Routine Blood Bank Laboratory (Part II – Chapter 11)
   A. Organization
   B. Personnel Requirements
   C. Standard Operating Procedures
   D. Transfusion Process Oversight

IV. Quality and Compliance Issues (Part V - Chapter 23)
   A. Quality Management
   B. Equipment Preventative Maintenance/Quality Control, qualification/ validation
   C. Supply and Reagent receipt, inspection, acceptance testing, QC
   D. Nonconformances

V. Fundamental Concepts (Part I)
   A. Basic Genetics / Blood Group Genetics (Chapter 2)
   B. Fundamentals of Immunology (Chapter 3)
   C. Concepts in Molecular Biology (Chapter 4)

VI. Blood Bank Testing Methodologies Overview (Part II- Chapter 5 and Chapter 12)
   A. Test tube – reagents, enhancement medias
   B. Automated methods – Gel, Solid Phase, other

C. Overview Advanced Methods –adsorption/ elution, inhibition, chemical treatments

VII. Blood Groups and Serologic Testing (Part II)
- A. The Antiglobulin Test (Chapter 5)
- B. The ABO Blood Group System (Chapter 6)
- C. The Rh Blood Group System (Chapter 7)
- D. Blood Group terminology and Other Blood Groups (Chapter 8)

Note: Sections VIII - XIII are covered in the second semester course – MDL 227

Immunohematology / Immunology II

VIII. Blood Collection (Part III – Chapters 13-14)
- A. Donor selection and qualification – health history questions, physical exam
- B. Collection type-
  - i. Whole blood veinipuncture
  - ii. Apheresis – blood, platelet, plasma
  - iii. Special Collections: Autologous, Homologous, and Directed
- C. Collection Processes

IX. Blood Components (Part III – Chapters 13-14)
- A. Component Production
- B. Blood Component testing / labeling
- C. Product Requirements and QC
- D. Product Storage and Distribution

Antibody Detection and Identification (Part II -Chapter 9)

- E. Low incidence antigens
- F. High incidence antigens
- G. Antibody Identification
  - i. Requirements to rule out specificities
  - ii. Requirements to confirm antibody identification
  - iii. Probability (P-value)
- H. Positive DAT

X. Transfusion Practices –
- A. Pre-transfusion Testing

B. Post-Transfusion Testing/ Transfusion Reactions/ Testing for Investigation of transfusion reactions

XI. Blood Group Systems – Characteristics of antigen/ antibody and special testing for antibody identification (if applicable)
   A. Lewis /H/I Systems
   B. Kell System
   C. Kidd System
   D. Duffy System
   E. MNS System
   F. P System
   G. Other Blood Group Systems

XII. Advanced Techniques
   A. Adsorption/ Elution
   B. Chemical Treatments
   C. Inhibition

Notes to Instructors

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