

**J. Sargeant Reynolds Community College  
Course Content Summary**

**Course Prefix and Number:** MDL 216

**Credits:** 4

**Course Title:** Blood Banking

**Course Description:** Teaches fundamentals of blood grouping and typing, compatibility testing, antibody screening, component preparation, donor selection, and transfusion reactions and investigation. Prerequisite or Co-requisite: MDL 210. Lecture 2 hours. Laboratory 5 hours. Total 7 hours per week.

**General Course Purpose:** The student will be required to identify, define, and/or describe key elements and variables of clinical blood banking and will be tested on these as part of the lecture component of the course. Subject areas will focus on principles and methodologies integral to modern blood bank practices, clinical significance of laboratory procedures in diagnosis and treatment, quality management principles, laboratory safety, problem-solving, and professional conduct.

**Course Prerequisites and Co-requisites:**

Prerequisite or Co-requisite: MDL 210

**Student Learning Outcomes:**

Upon completing the course, the student will be able to

- a. Describe basic principles of immunology;
- b. Distinguish between the four major blood types by their cell grouping reactions;
- c. Be able to determine, if given:
  1. Both parents' blood types; the possible blood types of the child;
  2. Mother's and child's blood types; what is the possible blood type of the father;
- d. Distinguish the four major blood groups according to their serum grouping reactions;
- e. For the following three nomenclatures of the Rh system, be able to use any of the nomenclatures and be able to interchange them:
  1. Fisher-Race;
  2. Weiner;
  3. Rosenfield;
- f. Describe the syndrome associated with Rh<sub>null</sub> phenotype;
- g. Describe the following about Lewis, MNSs, Ii, Lutheran, Kell, Duffy, Kidd, and other blood group systems:
  1. Immunoglobulin class;
  2. Best reaction temperature and medium;
  3. Whether fixes complement;
  4. Whether implicated in HDN or HTR;
- h. Describe the following procedures used in prenatal investigation of HDN:
  1. Family history;
  2. ABO and Rh types of both the mother and father;
  3. Screen on the mother for IgG antibodies;
  4. Antibody titer if necessary;
  5. Amniocentesis;
- i. Describe the following tests capable of diagnosing HDN after birth:
  1. ABO and Rh grouping of the mother and baby;
  2. Direct Coombs [DC] [DAT];

3. Hemoglobin of the baby;
  4. Bilirubin of the baby;
  5. Elution test;
  6. Peripheral blood smear of the baby;
  7. D rosette test on the mother's blood;
  8. Kleihauer-Betke Test on the mother;
- j. For the following types of transfusion reactions, describe the cause, symptoms, and prevention:
1. Acute hemolytic reaction;
  2. Delayed hemolytic reaction;
  3. Febrile reaction;
  4. Allergic and anaphylactic reaction;
  5. Bacterial contamination;
  6. Circulatory overload;
- k. When given a medical history, the results from the physical exam, and the material supplied at the time of registration, the student will be able to determine if the donor should be accepted or deferred;
- l. Name the four anticoagulants that can be used in the collection of a unit of blood and describe the advantages and disadvantages of each;
- m. From the list of components and derivatives below, the student will be able to describe the following about each:
1. How it is prepared;
  2. Storage temperature;
  3. Shelf life;
  4. Selection procedure for administration;
  5. Indications for administration;
  6. Effect of the component on the patient once it has been administered
    - Whole blood;
    - Packed red blood cells [PC or PRBC];
    - Leukocyte-poor red blood cells [BPRBC];
    - Frozen red blood cells;
    - Fresh frozen plasma [FFP];
    - Platelets;
    - Cryoprecipitated antihemophilic factor [AHF or cryo];
    - Leukocytes;
    - Single coagulation factors;
    - Plasma expanders;
- n. Describe the quality control procedures performed in the serology and the blood bank laboratories;
- o. Perform the following procedures with 100% accuracy by the end of the semester:  
(Psychomotor Skills)
1. ABO/Rh;
  2. Antibody screen;
  3. Antibody identification;
  4. Cross match;
  5. Direct Antiglobulin Test;
  6. Gel testing for AB/Rh, antibody screens; and
- p. Perform and describe the principles, reagents, procedure, and interpretation of results in serological tests.

**Major Topics to Be Included:**

- a. Genetics
- b. Immunology
- c. ABO system
- d. Rh system
- e. Other blood group systems
- f. Compatibility testing
- g. Antibody identification
- h. Hemolytic disease of the newborn
- i. Transfusion reactions
- j. Blood donation
- k. Component preparation and storage

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