

# Austin Community College

Medical Laboratory Technology

MLAB 2431 Immunohematology

Course Syllabus

**Spring 2004**

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**Office Hours:** Monday — 10:00 am - 12:00 pm  
Tues — 8:00 am - 12:00 pm  
Due to clinical obligations other days are by appointment.

**Length of Course:** 16 Weeks

**Total Number of Hours:** (Approximate)  
Classroom hours 48  
Laboratory 48

**Time:** Lecture: Monday & Wednesday  
8:00 am - 9:30 am  
January 12 – May 5

Laboratory: Wednesday  
9:45 am - 1:45 pm

**Location:** Room 6101 Bldg. D, RVS Campus

Revised: January 5, 2004

# **Medical Laboratory Technology**

## **MLAB 2431 Immunohematology**

### **INTRODUCTION**

Immunohematology is a specialized branch of laboratory medicine. It involves the study of the theory and practice of a wide variety of procedures used in the following: donor selection, component preparation and use, and techniques used to detect antigen/antibody reactions which may adversely affect a patient receiving a transfusion. The topics to be covered include: donor screening, preparation of components, antigens/antibodies of the ABO, Rh and other blood group systems, pretransfusion testing procedures, hemolytic disease of the newborn, neonatal and obstetrical transfusion practice, autoimmune hemolytic anemias and adverse affects of transfusion.

### **PREREQUISITES**

MLAB 1235 Immunology/Serology or department head approval.

### **COURSE GOALS**

Immunohematology is structured to meet the MLT Program goals addressing, but not limited to:

- developing a working knowledge of the principles and procedures of blood bank testing,
- producing accurate, skilled clinical laboratory workers with strong ethical and professional values,
- promoting respect and understanding of allied health professionals through renewed understanding of the clinical laboratory technician's role as a member of the allied health care team.

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

1. Describe the immune process as it relates to immunohematology.
2. Describe the donor selection process.
3. Describe the preparation and use of blood components.
4. Identify and describe the characteristics of the antigens and antibodies of the ABO, Rh, and other blood group systems.
5. Perform and understand routine blood bank procedures utilized in pretransfusion testing.
6. Perform and demonstrate an understanding for intermediate level blood bank testing in the resolution of antibody problems, hemolytic disease of the newborn and transfusion reaction workups.

7. Demonstrate improvement in the affective traits of organizational skills, work habits, attitude, interpersonal skills, and problem-solving ability.
8. Apply the principles, theories and practical information from MLAB 1235 Immunology/Serology and MLAB 1315 Hematology to the field of Immunoematology.

## SCANS

The U.S. Department of Labor has established the Secretary's Commission on Achieving Necessary Skills (SCANS) to ensure that student's are gaining competencies that are required in the work place. The following competencies will be acquired upon completion of Immunoematology:

SCAN COMPETENCY	IMMUNOHEMATOLOGY
Resources	Identify reagents and supplies needed for each lab, organize work so that the reagents, supplies, and equipment are utilized appropriately and work is completed within a reasonable time frame.
Interpersonal	Recognize limitations of expertise during the performance of procedures and communicate with instructor when problems arise. Maintain confidentiality of patient samples utilized. Demonstrate respect for fellow students during class time. Utilize the internet to interact with laboratory science students though the student list-serv.
Information	Apply knowledge gained from lecture, laboratory and the textbook to trouble shoot and problem solve serological results provided as case studies or results obtained during student laboratory.
Systems	Apply critical thinking skills to serological problems encountered. Apply knowledge gained from the Immunology/Serology and Hematology courses to the field of blood bank.
Technology	Achieve competency in routine blood bank procedures utilizing a variety of reagents, supplies and techniques. Become proficient in obtaining information about Immunoematology from the Internet.

## METHODS OF PRESENTATION

1. Lecture
2. Demonstration and discussion
3. Laboratory practice
4. Case studies
5. Computer exercises - BlackBoard, Internet Search, Online Quizzes

## TEXTBOOKS

1. **Required:** Quinley, Eva, Immunohematology, 2nd edition, 1998, Lippincott
2. **Recommended:**
  - a. AABB, Technical Manual, 14<sup>th</sup> edition, 2002.
  - b. AABB, Standards for Blood Banks and Transfusion Service, 22nd ed, 2003.
  - c. Mosby's Medical, Nursing and Allied Health Dictionary, current edition
  - d. Lippincott, A Manual of Laboratory & Diagnostic Tests, 7<sup>th</sup> ed, 2003.

## COURSE REQUIREMENTS AND REGULATIONS

1. Attendance Policy

Regular and punctual attendance is required at all lecture and laboratory sessions. Class roll will be taken. Absences must be explained to the instructor on the day of the absence by telephone or personal visit. If an absence is anticipated, the student is to make a scheduling arrangement in advance with the instructor. ***Four or more absences may be cause to withdraw a student from the course.*** A student who is five (5) minutes late is considered TARDY. Three (3) tardies constitute one absence. ***It is the student's responsibility to keep track of his/her attendance record and for all assignments, materials, examinations, etc., missed.***

2. Student Assistance Policy

It is the sincere desire of the program faculty to aid each student in developing his/her professional potential. Academic, clinical, and those personal problems that interfere with the student's development are of concern to the faculty. The program faculty has adopted the following policy:

- a. Personal Problems

The MLT student should feel free to make an appointment to discuss problems of a personal nature with a faculty member of his/her choice. In addition, the Health Science counselors are available for the student for additional counseling if necessary.

- b. Academic Problems

Problems encountered in the MLT lecture and/or laboratory sections should be brought to the attention of the course instructor. The instructor will work with the student to resolve the problem. If the student feels he/she cannot reach an agreement with the instructor, the student with the instructor should present the situation to the Program Director. All discussions with the faculty will remain confidential.

3. Dress Code
  - a. The student will be expected to attend class clean and neatly dressed.
  - b. A white laboratory coat must be worn buttoned during all laboratory sessions.
  - c. Footwear appropriate for a laboratory setting will be required.
  - d. Loose or dangling jewelry will not be permitted.
  - e. Hair that is shoulder length or longer **must** be worn up or securely tied back.
  - f. Strong smelling perfumes or after-shave lotion are inappropriate in the laboratory or clinical setting.
  - g. Latex gloves must be worn when handling body fluids or other potentially biohazardous materials.

## STUDENT EVALUATION

1. Measurement, Written
  - a. Six written examinations will be given over the lecture materials. All written examinations will be given online through BlackBoard. **All students are expected to take the exam during the time it is available or be given a grade of “0”.** Academic honesty is imperative. Exam grades will be compared to the final exam grade. The exam grade average must be comparable to the final exam grade.
  - b. Case study homework will be given through out the semester. The average grade will be determined and will count as **one exam grade**.
  - c. An Internet research project will be assigned and will be worth 65 points. This will be part of the lecture component of your grade. This must be 5 pages long with a cover page and bibliography. The instructor will provide the student with a copy of the rubric for determination of the grade.
  - d. Rent the video “And the Band Played On” (or borrow the instructor’s copy) and write a 2-3 page paper which must include a short review of the film and a statement of your personal thoughts and beliefs about the elements presented in the film. This will be worth 25 points to be a part of the lecture grade.
  - e. Perform exercises assigned on the Internet through BlackBoard and post to the discussion Board as assigned.
  - f. Complete online review quizzes and assignments prior to taking each of the major exams.
  - g. A comprehensive final examination will be given in the MLT classroom according to the lecture schedule.
2. Measurement, Practical

Laboratory sessions are designed not only to develop proficiency in blood bank testing, but also to provide additional information on the given topic areas and to develop

professional attitudes. Therefore, students are expected to attend each laboratory session. It ***will not*** be possible to make up a missed laboratory assignment due to specimen, reagent and/or instructor availability. (See Attendance Policy.)

Points are awarded for the successful completion of laboratory exercises. Student laboratory performance is evaluated using the following criteria:

- a. Familiarity with the procedure.
- b. Setting up and performing the procedure (organizational skills).
- c. Appropriate specimens and reagents are obtained and utilized.
- d. Proper use of equipment, reagents, supplies and specimens.
- e. Proper labeling, handling and disposal of specimens, tubes, etc.
- f. Organization and performance of individual tasks.
- g. Completion of tests within a reasonable amount of time.
- h. Clean up of work area.
- i. Correct interpretation of results with recognition of discrepancies or abnormal results being brought to the instructor's attention.
- j. Results are recorded and reported in proper format.
- k. Results of laboratory pre-tests.
- l. Proper response to study questions. ***Laboratory study questions must be turned in on time or will be given a grade of "0"***. Unless otherwise noted, lab study questions are due the week following the lab procedure.
- m. Results of laboratory practical exams.
- n. A notebook must be turned in on the last class day comprised of the following separate 3 areas: *pretests, study questions and result sheets*. Each section must be in numerical order according to the laboratory exercise number.
- o. Procedure cards are to be written for the major labs. The grade received will be added to the lab evaluation grade.
- p. Communication via the internet with the instructor and fellow students at designated times during the semester. Point value of each communication to be added to laboratory exercise grade.

### 3. Determination of Final Grade

- a. **Lecture: 2/3 of final grade**  
Items 1-6 will comprise 65% of the lecture grade.
  - 1) Examinations 600 points
  - 2) Case Studies 100 points
  - 3) Movie Review 25 points
  - 4) Internet Search 65
  - 5) Complete BlackBoard Assignments 100 points
  - 6) Major Exam Online Pretest 60 points (submit print out)
  - 7) Final Exam = 35%

b. **Laboratory: 1/3 of Final Grade**

- 1) Pretests = 10%
- 2) Lab Evaluation and procedure cards = 40%
- 3) Study Questions = 25%
- 4) Laboratory Practicals = 25%

c. **Grading System:**

- A** = 90 - 100%
- B** = 80 - 89%
- C** = 75 - 79%
- D** = 60 - 74%
- F** = 59% or below
- I** = Incomplete: A student must have a passing average (75% or better) and have completed at least 80% of the course work.
- W** = Withdrawal: Please meet with the MLT Program Coordinator before making any decision on withdrawal. We will assist you in any way possible with problem areas.

### **PROMOTION, FAILURE AND/OR DISMISSAL FROM THE PROGRAM**

1. A minimum grade of “C” (75%) is required in ***both the lecture and laboratory components*** of all Medical Laboratory Technology courses. Failure to meet the minimum passing score in each area will result in a grade of “D” for the course.
2. Any student may be withdrawn from the program for excessive absences (see Attendance Policy), consistently failing to meet class assignments, disruptive conduct, or for displaying conduct detrimental to the ethics of Medical Laboratory Technology.
3. The MLT faculty and staff understand that learning in group situations can be beneficial. However, each student is expected to demonstrate their own competency by doing their own work. ***Any student caught cheating on examinations, during lab practicals, or sharing lab results will be subject to disciplinary action including possible withdrawal from the program.***
4. The student may utilize the “Student Grievance Procedure of Austin Community College” in the disposition of a grievance or complaint without fear of recrimination or retaliation.

### **SPECIAL LABORATORY REQUIREMENTS**

1. It is the responsibility of the student to come prepared for each laboratory session by reading the procedure ***prior*** to the laboratory session.
2. A pre-test will be given at the beginning of each lab exercise to ensure readiness to perform the procedure. Laboratory quizzes may also be given.

3. Each student is responsible for his/her own work. If you are having difficulty with a particular procedure ***do not bother students around you.*** Any questions you have about the procedure, reagents or supplies should be directed to the instructor.
4. Due to the complex nature and difficulty of setting up and performing Blood Bank testing, ***talking is discouraged during laboratory exercises.***
5. Each student is responsible for cleaning up he/her work area. This will be closely monitored by the instructor.

## **LABORATORY SAFETY REGULATIONS**

1. Blood specimens possibly containing pathogenic organisms will be used in this course. Eating, drinking or smoking will not be permitted in the laboratory. **AVOID PUTTING OBJECTS IN YOUR MOUTH.**
2. Wear gloves when working with blood specimens.
3. Wash your hands before leaving the laboratory for any reason.
4. Remove gloves and wash hands immediately. **Never wear gloves outside of the laboratory area.**
5. Dispose of sharps, used glassware, specimens, contaminated gauze, etc. in properly labeled containers.
6. Disinfect work area thoroughly after each laboratory session by spraying with the 10% Clorox solution provided and wiping the area dry.
7. Cover excessive spills of blood with paper towels, soak thoroughly with disinfectant and wait 15 minutes before cleaning it up.
8. ***All accidents are to be reported immediately to the laboratory instructor.***

## **REQUIRED LABORATORY MATERIALS**

1. White laboratory coat
2. Ink pen (***PENCILS are not allowed***)
3. Felt tip marking pen (must ***not*** be water soluble)
4. Timer is not required but is strongly recommended

## MATERIALS OF INSTRUCTION

1. References
  - a. American Association of Blood Banks, Technical Manual, 14<sup>th</sup> edition, 2002.
  - b. American Society of Blood Banks, Standards for Blood Banks and Transfusion Services, 22<sup>nd</sup> edition, 2003.
  - c. Turgeon, M. L. (1995). Fundamentals of immunohematology. Philadelphia, PA: Lea & Febiger.
2. Audio-Visual Aids
  - a. Selected films/video tapes
  - b. Overhead transparencies
3. Computer

Instructor will assign computer internet assignments throughout the semester using BlackBoard. For discussion forum topics the students must post a reply and reply to one other post for each topic posted.

## EXTRA CREDIT

A maximum of 20 points may be earned which will be added to the exam grade total. The purpose of extra credit is to aid students who are very close to a higher grade, for example the student has an 89.4 which is a B, to obtain the higher grade. It is *NOT* utilized to artificially inflate grades.

The following items are suggestions for extra credit:

1. Volunteer work at Caritas or at health fairs not associated with the MLTSO.
2. Creation of a blood bank case study, 2 references required.
3. Short write up on a blood group system, 2 references required.
4. Turn in three current articles related to Immunohematology. Three articles are worth extra credit point.
5. Other items/suggestions may be recommended/approved by the instructor.

**MLAB 2431 IMMUNOHEMATOLOGY**  
**Spring 2003**

Date	Lecture Topic	Textbook Chapter	Laboratory Assignment
Jan 12	Syllabus I. Blood Collection	1	
Jan 14	I. Blood Collection (Continued)		1. Donor Interview 2. Donor Physical
Jan 19	MLK Holiday		
Jan 21	II. Blood and Blood Components	2 & 3	3. ABO and D Typing
<b><i>Exam 1 to Online- Lecture Topics I and II; Laboratories 1 and 2</i></b>			
Jan 26	III. Immunology and Complement	5	
Jan 28	III. Immunology and Complement IV. Principles of Serological Testing in Immunohematology.	5 6	3. ABO and D Typing (repeat) 4. Rh Phenotyping
Feb 2	V. Genetics VI. ABO and H Blood Group Systems	4 7	
<b><i>Exam 2 to Online - Lecture Topics, III, IV, and V; Laboratory - NONE</i></b>			
Feb 4	VI. (Continued)	7	5. Type and Screen
Feb 9	VII. Rh Blood Group System	8	
Feb 11	VII. (Continued) VIII. Pretransfusion Compatibility Testing	8 11	3. Repeat ABO and D Typing 5. Repeat Type and Screen
<b><i>Exam 3 to Online - Lecture Topics V and VI; Laboratories 3 and 4</i></b>			
Feb 16	VIII. Pretransfusion Testing (Continued)	11	
Feb 18	VIII. Pretransfusion Testing (Continued)	11	6. Crossmatch
Feb 23	VIII. Pretransfusion Testing(Continued)	11	
Feb 25	IX. Other Blood Group Systems	9	5. Repeat Type and Screen 6. Repeat Crossmatch
March 1	IX. Other Blood Groups(Continued)	9	
March 3	IX. Other Blood Groups (Continued) X. Identification of Unexpected Antibodies	9 10	Laboratory Practical 1
March 8	X. Identification of Antibodies (Continued)	10	
March 10	X. Identification of Antibodies (cont.) Class Discussion of Panel Case Studies	10	6. Repeat Crossmatch 7. Identification of Antibodies
<b><i>Exam 4 Online: Lecture Topics VIII, IX, and X; Laboratories - 5, 6 and 7</i></b>			
<b><i>March 15-19 SPRING BREAK</i></b>			
March 22	XI. Neonatal and Obstetrical Transfusion Practice	15	
March 24	XI. Neonatal/Obstetrical (Continued)	15	8. Direct Antiglobulin Test(DAT)

March 29	XI. Neonatal/Obstetrical (Continued)	15	
March 31	XI. Neonatal/Obstetrical (Continued)	15	9. Elution Study on Cordblood
<b><i>Exam 5 to Testing Center: Lecture Topic XI; Laboratories 8 and 9</i></b>			
April 5	XII. Adverse Effects of Blood Transfusion	13 & 14	
April 7	XII. Adverse Effects (Continued)	13 & 14	8. Repeat Direct Antiglobulin Test 10. Rh Immune Globulin Workup
April 12	XIII. Investigation of the Positive DAT and Immune Hemolysis	16	
April 14	XIII. Investigation of the Positive DAT (Continued)	16	11. Delayed Transfusion Reaction Work Up
April 19	XIII. Investigation of the Positive DAT (Continued)	16	
<b><i>Exam 6 Online: Lecture Topic XII and XIII; Laboratory - NONE</i></b>			
April 21	XIV. Quality Assurance	17	11. Delayed Transfusion Rxn WU (Cont)
April 26	XV. Transplantation		
April 28	<b><i>No Lecture, Entire Lecture and Lab Period Devoted to Laboratory Practical 2</i></b>		
May 3	<b><i>AS NEEDED</i></b>		
May 5	<b><i>FINAL EXAMINATION IN CLASSROOM</i></b>		

**I have read the MLAB 2431 Immunohematology Course Syllabus and understand the policies, procedures and requirements within.**

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Signature

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Date

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Printed Name