

This is a SouthArk Master Syllabus. The course syllabus distributed by the instructor may include additional requirements, must be followed by the student in the given term, and is considered to supersede the Master Syllabus.

Course Number

MLSC 2004

Course Title

Immunohematology/Immunology

Course Description

This course includes donor selection criteria; blood component collection, preparation, preservation and usage; identification of ABO, Rh, and other blood groups; concepts of compatibility testing, antibody detection and identification; perinatal testing of mother and baby; and special Blood Bank techniques and regulations in accordance with AABB and FDA rules and recommendations. An overview of genetics and immunology pertaining to the clinical blood bank and general laboratory are included. Basic blood banking and serology techniques are performed in the student laboratory.

College Mission

South Arkansas Community College promotes excellence in learning, teaching, and service; provides lifelong educational opportunities; and serves as a cultural, intellectual, and economic resource for the community.

ACTS Course **Program Course** Medical Laboratory Science

College Wide Student Learner Outcomes

Critical Thinking Responsibility Communication

Program Outcomes

1. Collect, process, and report tests on biological samples.
2. Recognize factors that affect methods and test results and take appropriate actions within established guidelines.
3. Perform and monitor routine departmental quality control.
4. Perform preventive and corrective maintenance of equipment and instruments.
5. Apply principles of laboratory safety, including Standard Precautions, and evaluate new technologies within the department.

ACTS Outcomes

None

Course Outcomes

#	Course Outcomes	Unit Outcomes/Competencies	ACTS	Program Outcomes	Critical Thinking	Communication	Responsibility	Assessment
1	Discuss the various functional areas of a blood bank.	3, 10, 27, 57,		1		C2		Test Number 1, 3
2	List the tests that are performed on blood components during donor processing.	4, 5, 13, 14, 15, 16, 21, 22, 23, 24, 25, 28, 29, 30, 27, 38, 60		2		C2		Test Number 1, 2
3	List the components that can be prepared from a unit of whole blood.	3, 7, 10, 11, 33, 39, 47, 61, 63		3		C2		Test Number 1, 2, 3
4	List the characteristics of all red blood cell antigens discussed in class.	1, 2, 6, 12, 34, 43, 45		4		C2		Test Number 1

5	List the characteristics of significant and insignificant antibodies.	17, 18, 19, 20, 44, 48, 49, 50, 51, 52, 54, 55, 56, 58, 59,		5		C2		Test Number 1, 2
6	Analyze the formation of H, A, and B antigens on the red cells from the precursor substance of the immunodominant sugars.	35, 41		6	CT3			Test Number 2
7	Define cold and warm autoantibodies.	26, 52, 53, 71, 72		7		C2		Test Number 1, 3, 4
8	Explain and perform the procedures: ABO and Rh typing; antibody screen, compatibility testing, indirect and direct antiglobulin test on appropriate specimens (donor units, venous blood, and cord blood).	9, 13, 31, 32, 40,		8		C2		Test Number 1, 2
9	Discuss the appropriate methods to identify the patient and donor accurately and to collect appropriate samples for testing.	61, 62		9			R3	Test Number 3
10	List the definition, cause, and characteristics of Hemolytic Disease of the Newborn.	46, 67, 68, 69		10		C2		Test Number 2, 4
11	Compare and contrast the different transfusion reactions.	64, 65, 66		11	CT3			Test Number 3
12	Analyze testing reactions, interpret the results.	48, 49, 50, 51, 52, 53		12	CT3			Test Number 2
13	Analyze to resolve discrepancies.	36, 37		13	CT3			Test Number 2
14	Discuss the genetics to blood typing and to antibody reactivity (dosage).	8, 42,		14		C2		Test Number 1, 2
15	Analyze the role of immunology to blood banking.	70, 76, 77, 78, 79, 81		15	CT3			Test Number 4, 5

Unit Outcomes/Competencies

Lecture One:

1. List the characteristics of the Red Blood Cell membrane.
2. List the three components the hemoglobin production is dependent on.
3. Discuss the principles and criteria involved in the storage of blood, platelets and Plasma for future transfusion.
4. List the additives that can be used for preservation of blood used for transfusion and the how each additive effects the shelf life of the unit of blood.
5. List the criteria used to validate a unit of blood, unit of platelets and a unit of Fresh Frozen plasma for transfusion.
6. List and discuss the various components that whole blood can be broken down to and preserved for future transfusion.
7. Discuss in detail the importance of 2,3 DPG in the role of RBC survival in a unit to be transfused.
8. Analyze the difference between Mendel's first and second law of genetics.
9. List the six different alleles possible with the ABO blood group.
10. Describe the reason why blood must sometimes be irradiated.

11. List the various blood types in relation to Fresh Frozen Plasma and analyze what blood type of plasma can be given to which blood type of recipient.

Lecture Two:

12. List and describe the pros and cons of three ways to reduce the zeta potential.
13. List the differences between Monoclonal and Polyclonal reagents and their uses.
14. List the steps in an antibody screen and what happens at each step.
15. Define what check cells are and discuss how they are used in Blood Banking procedures.
16. List the pros and cons of gel versus tube testing in Blood Bank.
17. List and discuss the two roles of the immune system.
18. Draw and label the structure of both the IgG and IgM antibody and discuss the conditions in which antibody will react optimally at.
19. Describe how complement works in the body.
20. Discuss the characteristics of antigens.
21. Describe the procedure used in weak D testing and why each step is important.

Lecture Three:

22. List the steps involved in and the reasons for performing an antibody identification test and direct Coombs test.
23. Analyze the difference between Polyspecific and Monospecific Coombs reagent and list the conditions when they should be used.
24. Interpret the results of an antibody identification test.
25. Define check cells and tell how and why they are used.
26. Define the difference between cold and warm antibodies and discuss the impact it has on a transfusion.
27. List the steps in the collection of sample for blood bank studies, rejection and or re-draw criteria and compatibility testing procedure and their significance.
28. Describe the conditions when it is appropriate to perform an immediate spin crossmatch.
29. List the steps and proper samples to use in a neonatal crossmatch.
30. Discuss the use of autologous transfusions.
31. Differentiate when to use monoclonal and polyclonal antihuman globulin in the Coombs test.
32. List and discuss the factors that influence the Coombs test.

Lecture Four:

33. List the frequencies of the ABO antigens.
34. Discuss the formation of the ABO antigens.
35. List the difference in reactions for subgroups of A and how they are proven to exist.
36. Discuss when it is appropriate or necessary to redraw a sample for Blood Bank testing.
37. List the definitions of group I, II, and III discrepancies in ABO typing.
38. Analyze the difference between forward and reverse typing.
39. List what units can be infused to the different blood types and why you can infuse these units.
40. Define universal donor and universal recipient and discuss their relevance in transfusion medicine.
41. List the characteristics of ABO secretors.

Lecture Five:

42. Chart the difference between Fisher-Race, Wiener, and Rosenfield terminology for Rh typing.
43. Describe what a weak D antigen is and how you test for it.
44. List the antigens ability to produce antibodies for the 5 Rh antigens.
45. Define the LW antigen and what Rh phenotypes are most compatible for the corresponding antibody.
46. Discuss the cause and prevention of Hemolytic Disease of the Newborn (both ABO and other classes of antibodies).
47. Describe the method used for preparing blood for an intrauterine or neonate transfusion.

Lecture Six

48. List the differences between the Lewis blood group and other blood groups.
49. List the testing characteristics of the Lewis antibodies.
50. Discuss the clinical significance of the Lewis antibodies.

Lecture Seven:

51. List the antigens in the MNS system and describe the clinical significance of their antibodies.
52. Discuss the clinical significance of the P antigen and its antibodies.
53. Discuss the clinical significance of the I antigen and its antibodies.
54. List the antigens in the Kell Blood Group and be able to discuss the clinical significance of their antibodies.

55. List the antigens in the Duffy Blood Group and be able to discuss the clinical significance of their antibodies and how enzyme treatment can help with identification of the antibodies to the Duffy system.
56. Define dosage effect and give examples.
57. Discuss the importance of Blood bank record keeping as it relates to the Kidd group.
58. List the antigens and antibodies in the Kidd Blood Group.
59. List the antigens in the Lutheran Blood Group and discuss the clinical significance of their antibodies.

Lecture Eight:

60. Name and describe the two basic types of unit donation.
61. List the criteria for donor screening and discuss each of their significance.
62. List the length of recovery time for each component that is taken from a donor.
63. List six blood components, their storage requirements, their shelf life, transfusion requirements, and the conditions or diseases they are used to treat,

Lecture nine:

64. List the symptoms of a hemolytic transfusion reaction.
65. Discuss the mechanism behind a delayed transfusion reaction.
66. List the steps a blood bank must take in the investigation of a possible transfusion reaction and tell why each step is required.

Lecture Ten/Lab 6:

67. Discuss the etiology of Hemolytic Disease of the Newborn.
68. List the tests and extra steps to be taken that involve testing of blood from a newborn (i.e. fetal screen, Kleinhauer-Betke stain, etc.)
69. Discuss the usage of Rhogam and its importance.

Lecture Eleven:

70. Discuss the mechanism in Autoimmune Hemolytic Anemia (AIHA).
71. Analyze the difference between cold and warm AIHA.
72. Discuss the clinical significance of anti-H in AIHA)

Lecture Twelve:

73. Analyze the difference between Innate and Adaptive immunity.
74. List the differences between Primary and Secondary Immunodeficiency.

Lecture Thirteen:

75. Define antigen, antibody, and epitope.
76. Draw and label the structure of an antibody.
77. Analyze the different actions of Papain and Pepsin on the structure of an antibody.
78. List the names and functions of the five types of antibodies.

Lecture Fourteen:

79. Discuss the role of compliment in Diabetes, Rheumatoid arthritis, Systemic Lupus Erythematosus, Graves Disease, Hashimoto's Thyroiditis, and Pernicious Anemia.

Lecture Fifteen:

80. List and discuss the three main tests for Syphilis.
81. Define reagin.
82. Discuss the tests available for the diagnosis of Atypical Pneumonia.
83. Discuss the clinical significance of Strep A infections and how the laboratory tests for this bacteria.
84. Discuss the clinical significance of Respiratory Syncytial Virus and the test used to detect the virus.

Lecture Sixteen:

85. List the difference between Hepatitis A, B, and C.
86. Discuss the diseases caused by Epstein - Barr virus.
87. Define the role of Cytomegalovirus in Chronic Fatigue Syndrome.
88. Analyze the difference between HSV-1 and HSV-2.
89. Discuss the clinical significance of Human Papilloma Virus.
90. Analyze the clinical significance of HIV and the importance of rapid testing capacity.

Assessment Description(s)

The final course grade will be determined by the student's scores on up to six pop quizzes, four scheduled examinations, one final examination (comprehensive), up to ten practical (lab) projects and two lab quizzes, and any additional student projects.

Materials and Technological Requirements

Harmening, Denise M., Modern Blood Banking and Transfusion Practices. 6th Edition (2005). Philadelphia: F.A. Davis Company. ISBN # 0-8036-459-8

Class Attendance Policy

Students are expected to attend all classes in which they are enrolled. If a student is absent from a class session, it is the student's responsibility to make arrangements to complete or make up any work missed. No make-up work for missed classes will be allowed without the approval of the instructor. Students who enroll late must assume all responsibility for work missed. Classes not attended as a result of late enrollment may be counted toward excessive absences. Students not attending the entire class period may be counted absent for that period. An instructor may drop students with a grade of "WE" if students have been absent for an excessive number of days. Warning letters will be sent to the students advising them of the consequences of nonattendance and urging them to contact their instructors immediately. Excessive absences are defined as follows:

Regular Semester

Courses which meet once a week	2 absences
Courses that meet twice per week	3 absences
Courses that meet four times per week	5 absences

Summer Session

Courses that meet four times per week in a five week session	3 absences
Courses which meet two evenings per week in a 10 week session	3 absences

Students enrolled in special programs or individualized instruction should contact their program director/instructor regarding specific attendance requirements for the program/course. Some of the selective-admission, health-science programs have specific criteria regarding attendance. Students are encouraged to refer to program policies in these matters.

Jury Duty/Military/Official School Function

Scheduled absences are those that occur due to college-related activities or as a result of summons to jury duty or military duty. Classes missed as a result of scheduled absences will not be counted as excessive absences if the instructor is notified and provided documentation prior to the absence(s). Make-up work for scheduled absences will be at the discretion of the instructor.

In all instances, documentation must be provided to the instructor within 24 hours of receipt. Documentation should come from an appropriate party on letterhead or other official stationery with a signature and contact information. Documentation should list the corresponding dates of the leave.

Medical leave

For medical-related absences, documentation must include written notice from the treating medical professional documenting time needed off related to medical reasons and time student may resume classes. The medical reason does not need to be listed on the documentation; the documentation must include only that there is a medical reason, the amount of time the student needs to be absent, and the time the student should be able to return to classes. Students who elect to work at home while on excused leave must meet with their instructors to make arrangements to do so. Working on coursework while on medical leave is not a requirement but can be requested by students. If students request that they be allowed to work at home while on an excused leave, the instructor will make every reasonable effort to ensure that the student is able to do so.

For students who have a medical condition necessitating time off or accommodation:

- 1) They may work at home on assignments if they choose to if on medical leave approved by a medical professional
- 2) Receive appropriate accommodations related to coursework (i.e., excused from labs with potentially harmful chemicals, have a larger desk, etc.)
- 3) Resume their studies where they left off once they return to classes
- 4) Be allowed to make up any missed work related to medical leave
- 5) Receive incompletes on their transcripts until coursework is completed, according to the incomplete grade contract.
- 6) Be given a reasonable time frame in which to complete missed coursework

Academic Honesty Policy

Students enrolled at South Arkansas Community College are expected at all times to uphold standards of integrity. Students are expected to perform honestly and to work in every way possible to eliminate academic dishonesty. Academic dishonesty includes cheating and plagiarism, which are defined as follows:

- Cheating is an attempt to deceive the instructor in his/her effort to evaluate fairly an academic exercise. Cheating includes copying another student's homework, class work, or required project (in whole or in part) and/or presenting another's work as the student's own. Cheating also includes giving, receiving, offering, and/or soliciting information on a quiz, test, or examination.
- Plagiarism is the copying of any published work such as books, magazines, audiovisual programs, electronic media, and films or copying the theme or manuscript of another student. It is plagiarism when one uses direct quotations without proper credit or when one uses the ideas of another without giving proper credit. When three or more consecutive words are borrowed, the borrowing should be recognized by the use of quotation marks and proper parenthetical and bibliographic notations.

If, upon investigation, the instructor determines that the student is guilty of cheating or plagiarism, the following penalties will apply:

- The student will receive a penalty of no less than a zero on the work in question.
- The instructor will submit a Student Academic Misconduct Form, written report of the incident, to the appropriate dean.
- The dean will submit form to Vice President for Learning to determine disciplinary action.
- The Vice President for Learning will determine whether further disciplinary action will be taken.
- All decisions may be appealed for review through the college's academic appeals procedure.

Equal Opportunity-Affirmative Action Statement

South Arkansas Community College does not discriminate on the basis of age, race, color, creed, gender, religion, marital status, veteran's status, national origin, disability, or sexual orientation in making decisions regarding employment, student admission, or other functions, operations, or activities.

Library Services

Library Homepage: <http://southark.libguides.com/homepage> Library Contact: LibraryStaff@southark.edu or 870.864.7115

Procedures to Accommodate Students with Disabilities:

If you need reasonable accommodations because of a disability, please report this to the Vice President of Student Services with proper documentation. VPSS Contact: 870.875.7262

The Early Alert System

In an effort to ensure student retention and success, South Arkansas Community College employs an Early Alert System to identify and support at-risk students as soon as possible in a given semester. The intent of Early Alert is to provide this assistance while there is still time to address behaviors or issues that have the potential of preventing students from completing their courses and degree plans. Students referred through the Early Alert System will be required to work on a corrective action plan with their student advising coach and to include attendance accountability and mandatory academic tutoring either in the academic division or in the Testing and Learning Center (TLC).

Once the Student Advising Coach has met with the referred student, and again when the student has met the prescribed corrective actions, the coach will update the Early Alert System so that the instructor is kept informed of the progress in resolving issues.

Behavioral Review Team

At South Arkansas Community College (SouthArk), we are committed to proactive leadership in student wellbeing and campus safety. By focusing on prevention and early intervention with campus situations that involve any person experiencing distress or engaging in harmful or disruptive behaviors, the BRT will serve as the coordinating hub of existing resources to develop intervention and support strategies and offer case management. Students, faculty, staff, and campus guests are encouraged to report any person on campus who is a concern. BRT Contact: 870.875.7262 BRT@southark.edu

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