CASPER COLLEGE COURSE SYLLABUS
MLTK 1600 H1: Clinical Immunohematology

Semester/Year: Spring 2016

Lecture Hours: 2  Lab Hours: 4  Credit Hours: 3

Class Time: Student Choice
Lecture Moodle
Lab dates H1 Section: January 28, February 18, March 3, April 7, May 5
H2 Section: Jan 29, Feb 19, March 4, April 8, May 6

Instructor’s Name: Bernardino D Madsen MT(ASCP)

Instructor's Contact Information:
Office Phone: 268-2522  Email: dmadsen@caspercollege.edu

Office Hours Aley 212: Monday 9-10, Tue 9-10, Wed 9-10, and 3-4 Thur 8-10

Course Description: Introductory course on the theoretical principles and procedures in immunohematology and serology (immunology) and their application in the medical laboratory. Emphasis is on blood banking procedures and potential problems that may be encountered in blood bank testing relative to antibody identification, compatibility testing, transfusion reactions and maternal/neonatal screening for hemolytic disease of the newborn. Course provides students with lectures and laboratory experience on immunohematology techniques.

Statement of Prerequisites:
BIOL 1000 or BIOL 1010 and MOLB 2210

Health Requirements You will need to obtain proof of the following health requirements to be in student laboratory.
- Health Insurance (Private or available through Casper College)
- Hepatitis B vaccination (at least the first in the series of three)

Goal:
Students will build upon their knowledge of immunology and physiology learned in precious coursework. Students will relate principles of immunology and tissue typing to a working comprehension of the technical and procedural aspects of clinical laboratory blood banking. Students will be able to utilize a variety of equipment and techniques to perform clinical testing of samples. Students will follow OSHA infection control and safety precautions while performing laboratory duties. Students will be able to describe and characterize their observations, correlate laboratory data to clinical conditions, disorders and disease states.

Outcomes:
1. Evaluate patient specimen for acceptability for analyses.
2. Differentiate mechanisms of immune response.
3. Relate immunologic theory to performance of procedures in the blood bank and serology laboratory.
4. Describe characteristics of common blood group systems, perform and interpret ABO blood grouping and Rh typing and resolve ABO discrepancies.
5. List the types of component therapy and perform and interpret compatibility testing, antibody identification, prenatal and postnatal testing, with identification of errors and resolution of discrepancies.
6. Describe appropriate pre- and post-transfusion testing associated with components.
7. Describe pathophysiology and laboratory investigation of transfusion reactions and hemolytic disease of the newborn.
8. Describe mechanisms associated with altered immune response.
9. Discuss principles and procedures associated with tissue transplantation.
10. Monitor and evaluate quality assurance data, identify errors and formulate plan for corrective action.
11. Critique patient results and select appropriate follow-up tests.
12. Solve problems using critical thinking and creativity (CC general education outcome #3)

Methodology:
Lectures that incorporate student discussion will be used to present content material. Mini-lessons and student discussion will be used in the laboratory setting for procedural and safety instruction in laboratory. Laboratory activities will be performed independently and will be assisted by one-on-one instruction.

Evaluation Criteria:

REQUIRED STUDENT TASKS/ASSIGNMENTS
The required tasks and assignments are used to evaluate the student’s acquisition and comprehension of the learning objectives. Assignments are designed to allow students to put the information learned in class and in readings into practice making judgments based on the data presented.

Examinations (50%)
Midterm exams will cover materials listed in the learning objectives for defined segments or units outlined on the lecture schedule. Most material will be covered specifically in class but, exam questions may cover materials presented in the assigned reading or laboratory. You may want to purchase review books (ASCP, NCA and others), which provide practice questions for subjects we cover in class. There will be five exams and a comprehensive final. Exams can only be made up if prior notification of absence is provided by the student.

Lab Skills And Practicals: (30%)
Students will be expected to practice laboratory skills to develop techniques used in manual and automated analysis. There will be three laboratory practical exams given during lab sessions. The purpose is to assess your knowledge of fundamentals and methodology, and skills in performing these techniques for clinical testing. Students will be presented with unknown antibodies as part of the laboratory practicals. Students will select appropriate testing methods and strategies for identification of unknown antibodies.

Lab Reports (10%)
Students will write a short report on each laboratory experience. Including the principle of each test performed the results and analysis of those results.

Case Studies (10%)
Students will be given case studies that include relevant patient history and laboratory test results. The students will evaluate patient data and answer questions concerning the results and make a diagnosis based on their knowledge.

**GRADING:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100%</td>
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<tr>
<td>B</td>
<td>82-91%</td>
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<tr>
<td>C</td>
<td>70-81%</td>
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<tr>
<td>D</td>
<td>60-69%</td>
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<tr>
<td>F</td>
<td>&lt;60%</td>
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Final grades: Lecture exams/Pop Quizzes/Final 50%
Lab skills/practicals 30%
Reports 10%
Case Studies 10%

**Required Text**

**Suggested Text**

**Required Personal Protective Equipment (PPE)**
Gloves
Scrubs (any color)
Safety goggles

**Class Policies:** Last Date to Change to Audit Status or to Withdraw with a W Grade is the Casper College deadlines.
Exams must be completed without the use of textbooks, notes or assistance from classmates. Attendance is required for lecture and student labs. No make-up labs will be available.

**Student Rights and Responsibilities:** Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

**Chain of Command:** If you have any problems with this class, you should first contact the instructor in order to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take your problem through the appropriate chain of command starting with the department head, then the division chair, and lastly the interim vice president for academic affairs.
Student complaints should be addressed through the following chain of command:
1) The instructor of your course. (Bernardino D Madsen)
2) The head of the MLT program. (Bernardino Madsen)
3) Dean of Health Science (Dr. Frankland)
4) The Interim Vice President for Academic Affairs (Dr. Shawn Powell).

**Academic Dishonesty - Cheating & Plagiarism:** Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct.

**ADA Accommodations Policy:** It is the policy of Casper College to provide appropriate accommodations.
to any student with a documented disability. If you have a need for accommodation in this course, please make an appointment with our Accommodative Services Counselor at 268-2557.

Topics in overview:

BLOOD COLLECTION AND PROCESSING
a. Interviewing donors and selection of donors
b. Collect blood
c. Type, screen and perform serology testing
d. Prepare blood components

INTRODUCTION TO IMMUNOLOGY
a. Architecture of the immune system
b. Branches of the immune system
c. Cells associated with the immune response
d. Non-specific immune response

BASIC IMMUNOLOGICAL CONCEPTS
a. Antigens and antibodies
b. Immune response
c. Complement

IMMUNOLOGICAL PROCEDURES
a. Types of assays
b. Specific applications to diagnosis of infectious diseases

BLOOD GROUP SYSTEMS
a. ABO
b. Rh
c. Lewis
d. Other systems

IMMUNOHEMATOLOGY TECHNIQUES
a. Preparation of red blood cell suspensions
b. Reading and grading agglutination and hemolysis
c. Compatibility testing
   1. ABO grouping
   2. Rh₀ (D) typing
   3. Du testing
   4. ABO discrepancy
   5. DAT
   6. Antibody screen and identification
   7. Elution
   8. Antigen typing
   9. Typing and screening
   10. Blood selection
   11. Crossmatch
   12. Pediatric infusion

TRANSFUSION PRACTICE
a. Processing of blood shipments
b. Issuance of blood and blood components
c. Pool platelets
d. Thawing and pooling of cryoprecipitate

e. Washing of red blood cells

f. Transfusion reactions and laboratory role in investigation

g. Infectious diseases/agents associated with blood products

**OBSTETRIC STUDIES**

a. Prenatal workup

b. Antibody titer

c. Cord blood workup

d. RhoGAM workup

**HEMOLYTIC DISEASE OF THE NEWBORN**

a. Pathophysiology

b. Laboratory evaluation

c. Treatment

**MISCELLANEOUS TOPICS**

a. Tumor immunology

b. Transplant immunology

**QUALITY ASSURANCE IN THE BLOOD BANK**

a. Quality control

b. CQI/TQM

c. Donor selection criteria

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**Lecture schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>1: January 18</td>
<td>Syllabus Immunology; Basic Principles</td>
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</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Notes</td>
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<td>2: January 25</td>
<td>Blood Bank Reagents</td>
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<td>Genetic Principles</td>
<td>2, 3</td>
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<td>3: February 1</td>
<td><strong>Exam 1</strong> (1,2,3)</td>
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<td>4: February 8</td>
<td>ABO Blood Group</td>
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<td>5: February 15</td>
<td>The Rh Blood group</td>
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<td>Other Blood groups*</td>
<td>5,6</td>
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<td>6: February 22</td>
<td><strong>Exam 2</strong> (4, 5, 6)</td>
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<td>7: February 29</td>
<td>Antibody Detection</td>
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<td>Compatibility Testing*</td>
<td>7,8</td>
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<td>8: March 7</td>
<td><strong>Exam 3</strong> (7, 8)</td>
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<td>9: March 14</td>
<td><strong>Spring Break</strong></td>
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<td>10: March 21</td>
<td>Donor Selection</td>
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<td>Testing of Donor Blood</td>
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<td>11: March 28</td>
<td>Blood Component Preparation and Therapy</td>
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<td>Adverse Complications of Transfusion *</td>
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<td>12: April 4</td>
<td><strong>Exam 4</strong> (9, 10, 11, 12)</td>
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<td>13: April 11</td>
<td>HDN</td>
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<td>14: April 18</td>
<td>Transfusion Therapy in Selected Patients</td>
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<tr>
<td>15: April 25</td>
<td>Quality Assurance</td>
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<td>Safety Issues in Transfusion Services</td>
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<tr>
<td>16: May 2</td>
<td><strong>Exam 5</strong> (13, 14, 15, 16)</td>
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<td>17: May 10</td>
<td><strong>Comprehensive final exam</strong></td>
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**Laboratory Schedule**

1-28/29: Tube ABO/Rh
2-18/19: Tube ABO/Rh and 3 cell screen
3-3/4: Antibody identification
4-7/8: Gel ABO/Rh, 3 cell screen and antibody identification
5-5/6: Lab final