CASPER COLLEGE
MLTK 1500 Clinical Hematology and Hemostasis

Semester/Year: Fall 2006
Lecture Hours: 2          Lab Hours: 4          Credit Hours: 3
Class Time: Lecture 2:00-2:50          Days: M, W
                         Lab 3:00-4:50          M, W
Room: LS109          Room: LS210
Instructor’s Name: Dino Madsen

Instructor's Contact          Office Phone: 268-2542          Email: dmadsen@caspercollege.edu
Home Phone: 266-9687

Office Hours: MW 12:00-2:00 LS 112

Course Description:
An introductory course in the theoretical principles and procedures of hematology and hemostasis combined with relevant application to clinical laboratory medicine. This course provides background knowledge and opportunities to develop technical competencies for laboratory testing of blood, blood products, coagulation, and anticoagulant therapy. Emphasis is on the formed elements of the blood and components of the coagulation cascade and their correlation with pathophysiology.

Statement of Prerequisites:
BIOL 1000 or BIOL 1010, MOLB 2210 or instructor permission.

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:
The students will build upon their knowledge and skills learned in previous laboratory classes gaining specific information on the formed elements of the blood, blood products, anemia, myelo- and lympho-proliferative disease, coagulation mechanisms and coagulopathies. Students will explain, characterize, compare and evaluate patient data for the presence of disease states and disorders. Students will demonstrate a working comprehension of the technical and procedural aspects of laboratory testing, safety and ethical standards of practice through performance and practice.

Outcomes:
1. Distinguish normal and abnormal microscopic characteristics of blood cells through performance of a complete blood count.
2. Perform manual and automated testing, assess laboratory data and predict the diagnosis of hematological and coagulation disorders and diseases.
3. Correlate hematological findings with those generated in other areas of the clinical laboratory.
4. Describe the origin and development of platelets.
5. Relate platelet structure to physiology and function.
6. List coagulation factors and describe their function in fibrin formation.
7. Distinguish modes of action and therapeutic use of anticoagulants.
8. Associate hemostatic dysfunction with clinical disease.

Methodology:
Formal and informal lecture, one-on one instruction, group demonstration and student laboratory are used in combination for student instruction.

Evaluation Criteria:
REQUIRED STUDENT TASK/ASSIGNMENTS
The required tasks and assignments are used to evaluate the student’s acquisition and comprehension of the learning objectives. Assignments are designed allow students utilize information from class lecture and discussion, and place into practice, technical skills and decision making. Details about each assignment (including grading criteria) will be discussed in class.

LECTURE EXAMS/POP QUIZZES/FINAL: (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. You may want to purchase review books (ASCP, NCA and others), which provide practice questions for subjects we cover in class. There will be three lecture exams and a comprehensive final. You must be present to take “pop” quizzes and earn those points. 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. Lab exams will challenge you to perform certain laboratory skills as well and analyze clinical situations, specimens and data. Exams can only be made up if prior notification of absence is provided by the student.

LAB REPORTS: (10%)
Students will perform laboratory tests related to RBC, WBC, platelets and the fibrin forming systems. For each lab exercise performed, the student will write a 1-2 page report describing the testing performed and the results obtained.

CASE STUDY: (10%)
Students are asked to review case studies that include relevant patient history, signs and symptoms and laboratory test results. The students will evaluate each case, describe the differential diagnosis strategy and answer questions.
GRADING:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Course Components</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100%</td>
<td>Final grades: Lecture exams/Pop Quizzes/Final</td>
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<tr>
<td>B</td>
<td>82-91%</td>
<td>Lab skills/Practicals</td>
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<tr>
<td>C</td>
<td>70-81%</td>
<td>Lab reports</td>
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<tr>
<td>D</td>
<td>60-69%</td>
<td>Case Study Evaluations</td>
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<tr>
<td>F</td>
<td>&lt;60%</td>
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Required Text, Readings, and Materials:


Required Personal Protective Equipment (PPE)
(you will need to purchase)
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 vice president for academic affairs.
Student complaints should be addressed through the following chain of command:
1) The instructor of your course. (Dr. Hentzen)
2) Biology Department Chair (Ms. Brandy Atnip)
3) The Life Science Division Chair, (Dr. Clifford).
4) The Vice President for Academic Affairs (Dr. Carmen Simone).

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 to see me at your earliest convenience.

Calendar or schedule indicating course content:

**Topical Outline**

**MORPHOLOGIC CHARACTERISTICS OF BLOOD CELLS**
- a. Erythropoietic cell series
- b. Abnormal erythrocytes
- c. Granulopoiesis
- d. Lymphopoiesis

**DIAGNOSIS OF LYMPHOPROLIFERATIVE DISORDERS**
- a. Chronic and acute lymphocytic leukemia
- b. Lymphoma
- c. Multiple myeloma
- d. Tests for lymphoproliferative disorders
  - 1. Bone marrow and lymph node biopsies
  - 2. Cell markers
  - 3. Cytogenetics

**DIAGNOSIS OF MYELOPROLIFERATIVE DISORDERS**
- a. Chronic and acute myelocytic leukemia
- b. Myeloproliferative diseases
- c. Myelodisplastic diseases
- d. Tests for myeloproliferative disorders
  - 1. Bone marrow biopsy
  - 2. Cytochemical staining
  - 3. Cytogenetics
  - 4. Molecular testing

**DIAGNOSIS OF ANEMIA**
- a. Iron, cobalamin and folate deficiencies
- b. Sideroblastic anemia
- c. Immune hemolytic anemia
- d. Thalassemia
- e. Hemoglobins S, C, D and E
- f. Enzymatic deficiencies
- g. Tests for anemia diagnosis
  - 1. Iron studies
  - 2. DAT
  - 3. Hemoglobin electrophoresis
  - 4. Enzyme tests

**THE VASCULAR SYSTEM**
- a. The role of blood vessels in coagulation
- b. Tests of blood vessel integrity
- c. Bleeding disorders associated with vessel dysfunction
THE PLATELET SYSTEM
a. The origin of platelets
b. The physiology and function of platelets
c. Tests of platelet number and function
   1. Platelet count
   2. Bleeding time
   3. Platelet aggregation
d. Bleeding disorders involving platelets

FIBRIN FORMATION
a. Coagulation factors and interactions
b. Regulation of the coagulation cascade
c. Tests of the coagulation cascade
d. Bleeding disorders involving coagulation factors
   1. Prothrombin time
   2. Partial thromboplastin time
   3. Thrombin time
   4. Factor assays

FIBRINOLYSIS
a. The process of fibrinolysis
b. Hypercoagulability and disseminated intravascular coagulation
c. Thrombolytic and anticoagulant therapy
d. Tests for fibrinolysis
   1. Fibrin degradation products
   2. D-dimer test