

**LANCASTER GENERAL COLLEGE FOR NURSING & HEALTH SCIENCES
CLINICAL LABORATORY SCIENCE PROGRAM**

SYLLABUS - Spring 2006

I. Title: CLS 122 Clinical Hematology II

II. Course Description

This lecture course builds upon the material covered in Clinical Hematology I. It includes fundamentals of Body Fluid Analysis, Hematology Instrumentation with Quality Control, and Coagulation. The first unit covers formation and functions of body fluids, and changes caused by disease. The routine and specialized laboratory tests useful in the diagnosis and management of disorders involving body cavities are then explored. The second unit covers the principles of automated cell counting and differentiation, with emphasis placed on data interpretation, troubleshooting, instrument maintenance, and quality control. The final 3 units cover the anatomy and physiology of coagulation. Routine and diagnostic coagulation tests are studied to determine how they can be effectively used for diagnosis and management of disorders of hemostasis. The material is presented using a combination of formal lectures, transparencies, images, class discussions, demonstrations, case histories, a self-study CD, and study questions.

III. Prerequisite Successful completion of CLS 121 [Clinical Hematology I]

IV. Placement Spring Semester

V. Time Allotment Theory: 52 hours
Laboratory: 0 hours

VI. Faculty: Anne L. Cousar, BS, MT (ASCP) SH, Clinical Instructor

VII. Credits: 4

VIII. Textbooks: *Clinical Laboratory Hematology*, McKenzie, Pearson Prentice Hall, 2004
Urinalysis and Body Fluids, Strasinger and Di Lorenzo, 4th Ed., F. A. Davis, 2001

IX. Evaluation the final grade will be determined by adding all of the points earned in Quizzes, Exams, and Assignments

In order to pass the course, a minimum grade of 74% (C) must be obtained in each of the following.

- **Final Average for Quizzes, Exams, and Class Participation**
- **Image section of the Body Fluid Exam**
- **Average score of 3 Coag Exams**

X. References

Textbooks:

- Fundamentals of Urine and Body Fluid Analysis, 2nd Ed., Brunzel, Saunders, 2004
- Urinalysis and Body Fluids, A Color Text and Atlas, Ringsrud and Linné, Mosby, 1995
- Clinical Hematology and Fundamentals of Hemostasis, 4th Ed., Harmening, F A Davis, 2002
- A Color Atlas and Instruction Manual of Peripheral Blood Cells, O'Connor, Williams and Wilkins, 1984
- Hematology Clinical Principles and Procedures, 2nd Ed., Rodak, W B Saunders, 2002
- Clinical Hematology: Principles, Procedures, Correlations, 2nd Ed. Stiene-Martin, Lippincott, 1992
- Hematology, A Combined Theoretical and Technical Approach, Simmons, Butterworth Heinemann, 1997
- Hematology Principles and Procedures, 6th Ed., Brown, Williams and Wilkins, 1993
- Clinical Hematology: Theory and Procedures, 3rd Ed., Turgeon, Lippincott, Williams and Wilkins, 1999.

Additional Materials and References:

- Scientific publications: *Laboratory Medicine, Medical Laboratory Observer*
- Photomicrographs from Body Fluids, Laboratory Examination of Amniotic, Cerebrospinal, Seminal, Serous, and Synovial Fluids, 3rd Ed, **Kjeldsberg** and Knight, ASCP Press, 1993
- Tech/Check Sample Case Study Modules

- Coulter Casebook: “3-Part Diff using Impedance Technology”
- Coulter Casebook: “Histogram Differential with Interpretive Report and VCS Technology”
- Photomicrographs/stained blood films from CAP proficiency evaluations and ASCP workshops
- Selected histories from LGH patients
- Inserts from commercial Test Kits

Video

- Bleeding Time
- The Gene Factor: Gene Therapy for Hemophilia

XI. Course Objectives By the conclusion of the course, the student must

1. Discuss the anatomy, physiology, formation, and functions of cerebrospinal, serous, synovial, and seminal fluids, and the anatomy, physiology, and biochemistry of hemostasis.
2. Classify and describe the etiologies of disorders associated with abnormalities in body fluids and hemostasis.
3. Explain how basic, specialized, and diagnostic lab tests are used in the diagnosis and management of disorders involving body fluids and disorders of hemostasis.
4. Apply the basic principles, procedures, and techniques used for laboratory testing of body fluids, hematology, and coagulation procedures, including specimen collection, quality control, and sources of error.
5. For all hematology and body fluid tests, discuss the procedures for standardization/calibration, quality control, identification of system and random errors, validation of test results, alternative testing methods, and routine maintenance.
6. Explain the principles of operation for all instruments used in hematology and coagulation including both complex primary analyzers and basic back-up instruments.
7. Identify, either visually or from written description, normal, reactive, and malignant cells commonly found in body fluids, and explain their significance.
8. Calculate, and interpret results for body fluid, hematology and coagulation tests.
9. Correlate obtained patient data with other laboratory test results to make appropriate judgments about the validity of the test results and the need for additional tests.
10. Use a problem solving approach to all areas of endeavor in the hematology lab.

11. Apply knowledge and skills to interpret data presented in case studies.

XII. School Policies:

Students are held accountable for all policies in the Student Handbook and any revisions made to those policies during the academic year.

XIII. Class:

A. Importance of Attending Class

Healthcare education comprises more than just private reading and passing of exams. Students shall recognize that active and informed participation in class is essential to the development of intellectual abilities and scholarly growth. Students must also recognize the importance, for both the present and future, of achieving an academic record that reflects their intellectual ability. Such records are seldom achieved without regular attendance and participation in class activities. Attendance will be taken.

B. Student Responsibility for Missed Material

Students are responsible for all material presented and announcements made in class, regardless of attendance. It is the student's responsibility to obtain materials and assignments if absent.

C. Unit Examinations

Examinations should only be missed in extenuating circumstances with approval of the instructor. A student who misses an exam will be required to make up the exam on the next day of lecture. Contact the appropriate instructor before the next lecture day to make arrangements to take the exam.

A student who misses an exam, without instructor approval, will have ten percent (10%) deducted from the grade achieved on the exam. Example: The exam is worth sixty (60) points; the student takes the exam and achieves a grade of 52/60. The score of 52 is then decreased by 10% or five points; thus, the grade on the exam will be 47/60. An alternate exam may be given for the makeup exam.

D. Class Behavior

Once class has started, the instructor has the prerogative not to admit students into lecture. Students will be dismissed from class for any inappropriate behavior.

XIV. Other: Academic Dishonesty and Plagiarism

Academic dishonesty violates the spirit and purpose of an academic community and is therefore subject to disciplinary action. Academic dishonesty includes cheating on exams and unauthorized duplicate submission of work.

Plagiarism is an act of academic dishonesty. Any work submitted that is not your own is plagiarism. In preparing assignments, you must acknowledge in writing any use of outside sources or any assistance you received in preparing an assignment.

If an instructor believes a student has committed an act of academic dishonesty or has plagiarized material, the instructor will award a failing grade for that assignment. If the occurrence is during an exam, the student will receive a zero for that portion of their grade and must leave the room.

If the student disagrees with this decision, the student may follow the grievance procedure.

CONTENT	HRS	STUDENT ACTIVITIES	OBJECTIVES
<p>Unit # 1: Body Fluid Analysis</p> <ol style="list-style-type: none"> 1. Cerebrospinal Fluid 2. Serous Fluid (pleural etc) 3. Manual Cell Counts /Cytospin 4. Fluid Cell Counts and Diff 5. Image ID: Normal, React, Malig cells 6. Synovial Fluid Analysis 7. Semen Analysis <p>EXAMINATION – UNIT 1</p>	7	<p>Required Reading:</p> <ul style="list-style-type: none"> ▪ McKenzie – Chapter 33 ▪ Strasinger –CSF /Cell Counts Chapter 10; Serous Chapter 13; Synovial Chapter 12; Semen Chapter 11 <p>Homework</p> <ul style="list-style-type: none"> ▪ Self-Study CD: Analysis of Body Fluids ▪ Unit 1 - Practice Cell Count Calculations <p><u>Classroom Activities:</u></p> <ul style="list-style-type: none"> ▪ Lecture ▪ Transparencies ▪ PowerPoint ▪ Kodachrome Images 	1-7 8-11
<p>Unit # 2: Instrumentation and QC</p> <ol style="list-style-type: none"> 1. The Coulter Principle and 3-part Diff 2. Spurious Instr. Results 3. Coulter VCS Technology and 5-part Diff 4. The Sysmex CBC and Diff 5. Flow Cytometry and Applications 6. Cell Counter Calibration and Controls 7. Longitudinal Process Control 8. Delta Checks <p>Unit 2 continued</p>	9	<p>Required Reading: all from McKenzie</p> <ul style="list-style-type: none"> ▪ Pp 816-832 ▪ Pp 837-850 (spurious results and QC) ▪ Pp 419-426; 431-432; 614-615 <p>Homework (not graded)</p> <ul style="list-style-type: none"> ▪ 2 Coulter Casebooks: Coulter S 3-Part Diff and VCS 5-Part Diff ▪ Unit 2 Study Quest. 1 – Spurious Results-ID and Corrective Action ▪ Unit 2 Study Quest. 2 – STKS Cases from LGH <p><u>Classroom Activities:</u></p>	4-6 8-11

CONTENT	HRS	STUDENT ACTIVITIES	OBJECTIVES
Class Discussion EXAMINATION – UNIT 2		<ul style="list-style-type: none"> ▪ Lecture ▪ Transparencies ▪ Class discussions 	
Unit # 3: Physiologic Hemostasis 1. Introduction 2. Mechanisms of 1° and 2° Hemostasis 3. Platelet Ultra structure and Biochemistry 4. Coag Factor Families 5. Physiologic Fibrinolysis and Anticoagulants 6. Specimens for Coag testing Quiz EXAMINATION – UNIT 3	9	Required Reading <ul style="list-style-type: none"> ▪ Chapter 34 (primary) ▪ Chapter 35 (secondary) ▪ Chapter 39, pp 784-785 (specimens) <u>Classroom Activities:</u> <ul style="list-style-type: none"> ▪ Lecture ▪ Transparencies 	1 4
Unit # 4: Laboratory Evaluation of Hemostasis 1. 1° Hemostasis: Screening and Dx tests 2. 2° Hemostasis: Screening and Dx Tests 3. Tests for Fibrinolysis 4. Tests for Physiologic Anticoagulants 5. Tests for Pathologic Inhibitors 6. Coag Instrumentation and QC EXAMINATION – UNIT 4	9	Required Reading: McKenzie <ul style="list-style-type: none"> ▪ Chapter 34 (primary) ▪ Chapter 35 (secondary) Homework <ul style="list-style-type: none"> ▪ Unit 4 Study Questions <u>Classroom Activities:</u> <ul style="list-style-type: none"> ▪ Lecture ▪ Transparencies ▪ PowerPoint ▪ Class Demonstrations ▪ Video – Bleeding Time Test 	3-6 8-10
Unit # 5: Coagulation Disorders – Diagnosis and Management 1. Thrombosis - Venous vs Arterial 2. Thrombophilia: Inherited and Acquired 3. DIC and Primary Fibrinolysis 4. Therapeutic Anticoagulants: Heparin and Coumadin 5. Bleeding Disorders - 1° Hemostasis 6. Bleeding Disorders - 2° Hemostasis QUIZ Class Discussions EXAMINATION – UNIT 5	18	Required Reading: McKenzie <ul style="list-style-type: none"> ▪ Chapter 38 (Thrombosis and Thrombophilia) ▪ Chapter 36 (1° Hemostasis) ▪ Chapter 37 (2° Hemostasis) Homework <ul style="list-style-type: none"> ▪ Unit 5 Study Questions ▪ Final Coag Cases <u>Classroom Activities:</u> <ul style="list-style-type: none"> ▪ Lecture ▪ Transparencies ▪ PowerPoint ▪ Video – The Gene Factor ▪ Selected Cases ▪ Class Discussion 	2-4 8-11