MLAB 1315HYB

HEMATOLOGY

SPRING 2021

Please Note: Due to extenuating circumstances, including public health issues, course and testing delivery methods, instructional schedules, housing contracts, campus procedures and/or operating hours may be altered, interrupted and/or ceased for a limited or extended period of time. Such changes will be posted on the College website.

TABLE OF CONTENTS

GRAYSON COLLEGE
MEDICAL LABORATORY TECHNOLOGY

MLAB 1315HYB – HEMATOLOGY

Course Information

MLAB 1315 HYB – Hematology
Placement: Spring semester of the freshman year (1st 8-week Term)

Professor Contact Information

Instructor Name: Aimee Flynn (903) 463-8684
Email: flynna@grayson.edu Office Location: STC 204

On-Campus Office Hours:
Tuedays: 1030am – 1200pm
Fridays: 830am – 1200pm

Course Pre-requisites

1. Acceptance into the MLT-AAS Program
2. Current enrollment or previous completion of MLAB 1201 and MLAB 1335, or consent of the MLT Program Director

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Course Description

MLAB 1315. Hematology. Introduction to the theory and practical application of routine and special hematology procedures, both manual and automated; red blood cells and white blood cells maturation sequences, and normal and abnormal morphology and associated disease.

Course Objectives

Every chapter in the text and laboratory exercise has specific objectives listed. Please refer to those sections of the syllabus for the cognitive and psychomotor objectives.

The following affective objectives pertain to both the classroom and clinical components:

1. Display professionalism by:
    a. demonstrating integrity, empathy, self-motivation, appearance/personal hygiene, time-management, respect and patient advocacy
    b. complying with the program dress code
2. Exhibit enthusiasm and interest in the profession of medical laboratory technology by asking questions, participating in class discussions and meeting with professors during office hours as needed.
3. Demonstrate progression in laboratory skills by effective organization, coordination of multiple tasks and insightful evaluation of results obtained.

SCANS COMPETENCIES AND FOUNDATION SKILLS CIP: 51.1004	MLAB 1201	MLAB 1291	MLAB 1335	MLAB 2331	MLAB 1315	MLAB 1127	MLAB 1311	MLAB 1231	MLAB 2434	MLAB 2401	MLAB 2238	MLAB 2660/1	PLAB 1223	PLAB 1160/1
Resources														
Allocates Time	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Allocates Money														
Allocates Material and Facility Resources	X	X	X	X	X	X	X		X	X	X	X	X	X
Allocates Human Resources												X		
Information														
Acquires & Evaluates Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Organizes & Maintains Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Interprets & Communicates Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Uses Computers to Process Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Interpersonal														
Participates as a Member of a Team	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Teaches Others	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Serves Clients/Customers												X		X
Exercises Leadership	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Negotiates to Arrive at Decision	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Works with Cultural Diversity	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Systems														
Understands Systems	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Monitors & Corrects Performance	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Improves & Designs Systems	X		X				X		X	X		X		X
Technology														
Selects Technology	X	X	X	X	X	X	X	X	X	X		X	X	X
Applies Technology to Task	X	X	X	X	X	X	X	X	X	X		X	X	X
Maintains & Troubleshoots Technology	X	X	X	X	X	X	X	X	X	X		X	X	X
Basic Skills														
Reading	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Writing	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Arithmetic	X	X	X	X	X	X	X	X	X	X	X	X		
Mathematics	X	X	X	X	X	X	X	X	X	X	X	X		
Listening	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Speaking	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Thinking Skills														
Creative Thinking	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Decision Making	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Problem Solving	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Seeing Things in The Mind's Eye	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Knowing How to Learn	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Reasoning	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Personal Qualities														
Responsibility	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Self-Esteem	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sociability	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Self-Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Integrity/Honesty	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Course Goals

Upon completion of this course the graduate should be prepared to function as a member of the health care team with the following duties and/or responsibilities:

1. To perform routine hematology laboratory tests and verify their validity with a quality assurance program in accordance with established standards of service
2. To perform simple instrument maintenance
3. To apply the problem solving approach to distinguish situations that necessitate independent action from those that require referral to a supervisor.
4. To display a professional attitude toward colleagues.
5. To prepare records and transmit results accurately.
6. Observe safety policies and procedures.
7. Participate in continuing education.
8. Project an image of professionalism in appearance and conduct at all times.

Course Outline

I. Basic Hematology Principles

Ch.1: Introduction to Hematology and Basic Laboratory Practices
Ch.2: From Hematopoiesis to the Complete Blood Count
Ch.3: Red Blood Cell Production, Function, and Relevant Red Cell Morphology
Ch.4: Hemoglobin Function and Principles of Hemolysis

II. Red Cell Disorders

Ch.5: The Microcytic Anemias
Ch.6: The Macrocytic Anemias
Ch.7: Normochromic Anemias, Biochemical and Membrane Disorders, and Miscellaneous Red Cell Disorders
Ch.8: The Normochromic Anemias Due to Hemoglobinopathies

III. White Cell Disorders

Ch.9: Leukopoiesis and Leukopoietic Function
Ch.10:Abnormalities of White Cells: Quantitative, Qualitative, and the Lipid Storage Diseases
Ch.11:Acute Leukemias
Ch.12:Chronic Myeloproliferative Disorders
Ch.13:Lymphoproliferative Disorders and Related Plasma Cell Disorders
Ch.14:The Myelodysplastic Syndromes

Required Textbook

Required:

1. Ciesla, Betty, Hematology in Practice, 3rd ed., Philadelphia, F.A. Davis Co., 2018 ISBN: 9780803668256 / 9780803668249

Recommended: Numerous additional texts covering this topic are available in the MLT library or from the Instructor.

SPECIFIC LECTURE OBJECTIVES (Cognitive Domain)

After completion of each chapter, the student will be able to

Chapter 1: Introduction to Hematology and Basic Laboratory Practice

1. Discuss the function and magnification of each of the microscope objectives.
2. Describe safe work practices, including personal protective equipment and disposal of biological hazards.
3. Describe the components of quality assurance and quality control within the hematology laboratory.
4. Define the terms *preanalytic and postanalytic variables, delta checks, reflex testing, accuracy, precision, reproducibility,* and *reference intervals*.

Chapter 2: From Hematopoiesis to the Complete Blood Count

1. Define the components of hematopoiesis.
2. Describe the organs used for hematopoiesis throughout fetal and adult life.
3. Define the microenvironment and the factors affecting differentiation of the pluripotent stem cell (PSC).
4. Differentiate between intramedullary and extramedullary hematopoiesis.
5. Discuss the four functions of the spleen.
6. Define the myeloid:erythroid ratio.
7. Review the bone marrow procedure, methods and materials, and the technologist's role in ensuring that bone marrow was recovered.
8. List the components of the complete blood count (CBC).
9. Calculate red blood indices.
10. Describe clinical conditions that cause shifts in the mean corpuscular volume (MCV).
11. Recognize normal and critical values in an automated CBC.
12. Describe ineffective and effective erythropoiesis.

13. Describe the clinical conditions that may produce polychromatophilic cells and elevate the reticulocyte count.
14. Summarize the physical symptoms and laboratory findings in cases of anemia.
15. Define the reticuloendothelial system (RES).

Chapter 3: Red Blood Cell Production, Function, and Relevant Red Cell Morphology

1. Diagram erythropoietic production from origin to maturation with emphasis on stages of red cell development.
2. Describe immature red cells with regard to nucleus cytoplasm ratio, cytoplasm, nuclear structure, and size.
3. Identify the three major red blood cell metabolism pathways essential for red blood cell energy needs.
4. Describe the composition of the red cell membrane with regard to key proteins and lipids.
5. List the plasma factors that affect red cell life span.
6. Differentiate between microcyte and macrocyte.
7. Indicate the clinical conditions in which variations in size are seen.
8. Indicate the clinical conditions in which the variations in hemoglobin content are seen.
9. Describe the clinical conditions that show polychromatophilic cells.
10. Identify the pathophysiology and the clinical conditions that may lead to target cells, spherocytes, ovalocytes/elliptocytes, sickle cells, and the fragmented cells.
11. List the most common red cell inclusions and the disease states in which they are observed.

Chapter 4: Hemoglobin Function and Principles of Hemolysis

1. Define the normal structural elements related to hemoglobin synthesis and identify its components
2. Describe hemoglobin function.
3. Describe the origin of hemoglobin synthesis in erythroid precursors.
4. List the normal adult hemoglobins.
5. Describe the chemical configuration and percentages of the normal adult hemoglobins, Hgb A, Hgb A_2, and Hgb F.
6. Describe the oxygen dissociation curve in general terms.
7. Differentiate the abnormal hemoglobins in terms of toxicity and oxygen capacity.
8. Describe hemolysis in terms of its effect on the bone marrow, blood smear, and blood chemistry.
9. Describe extravascular hemolysis with respect to organ of origin and laboratory diagnosis.
10. Define intravascular hemolysis with respect to organs affected and laboratory diagnosis.

Chapter 5: The Microcytic Anemias

1. Describe the red blood cell indices related to the microcytic anemias.
2. List the microcytic anemias considered in a differential diagnosis of microcytic processes.
3. Describe iron transport from ingestion to incorporation in hemoglobin.
4. Describe the causes and physical symptoms of an individual with iron deficiency anemia.
5. Identify the laboratory tests for an individual with iron deficiency anemia.
6. Describe the iron overload conditions.
7. Describe the diagnosis and clinical management of individuals with hereditary hemochromatosis.
8. Describe the basic pathophysiological defect in the thalassemia syndromes.
9. Describe the alpha thalassemic conditions with regard to gene deletions and clinical symptoms.
10. List the types of alpha thalassemia.
11. Correlate the morphologic changes in the red blood cell with the defect in the alpha and beta thalassemias.

Chapter 6: The Macrocytic Anemias

1. Define *megaloblastic anemia* as a macrocytic anemia.
2. Compare and contrast the bone marrow characteristics of megaloblastic anemia.
3. Differentiate red cell and white cell changes in the peripheral smear that are seen in the megaloblastic anemias.
4. Describe ineffective hematopoiesis as it relates to the megaloblastic process.
5. Describe the pathway of vitamin B_{12} and folic acid from ingestion through incorporation into the red cell.
6. List the sources of vitamin B_{12} and folic acid.
7. Define pernicious anemia and its clinical and laboratory findings.
8. Describe the relevant laboratory tests used in the diagnosis of megaloblastic anemia.

Chapter 7: Normochromic Anemias: Biochemical and Membrane Disorders and Miscellaneous Red Cell Disorders

1. Identify the red blood cell membrane defect in hereditary spherocytosis.
2. Identify the proteins necessary to maintain red blood cell membrane integrity.
3. Describe the relevant red blood cell morphology in patients with hereditary spherocytosis.
4. Describe the osmotic fragility test and its clinical usefulness.

5. Compare and contrast the clinical and peripheral smear findings from hereditary stomacytosis, hereditary elliptocytosis, and hereditary pyropoikilocytosis.
6. Describe Heinz bodies with respect to their appearance in supravital and Wright's stain.
7. Describe the neonatal jaundice related to glucose-6-phosphate dehydrogenase (G6PD) deficiency and its treatments.
8. Discuss the characteristics of aplastic anemia, paroxysmal nocturnal hemoglobinuria, paroxysmal cold hemoglobinuria, Fanconi's anemia, and Diamond-Blackfan syndrome.

Chapter 8: The Normochromic Anemias Caused by Hemoglobinopathies

1. Describe the pathophysiology of the sickle disorders.
2. Identify the amino acid substitution in sickle cell disorders.
3. Identify the amino acid substitution in Hgb C disease.
4. Describe the inheritance patterns of the sickle disorders.
5. List the clinical and laboratory features of sickle cell anemia, sickle cell trait, hemoglobin C disease, hemoglobin C trait, and hemoglobin SC disease.
6. Review the physiological conditions that most typically affect individuals with sickle cell anemia.
7. List conditions that may precipitate a sickle cell crisis.
8. Recognize normal and abnormal hemoglobin patterns on electrophoresis at pH 8.6 and 6.2.
9. Calculate the white blood cell correction formula when nucleated red blood cells are noted in the peripheral smear.

Chapter 9: Leukopoiesis and Leukopoietic Function

1. Describe leukopoiesis and the steps leading from immature forms to maturation.
2. List the maturation sequence of the granulocytic series.
3. Name four morphological features that are helpful in differentiating the cells of the granulocytic series.
4. Describe the physiology and function of granulocytes.
5. Recall the normal relative and absolute counts for all white blood cell populations and be able to calculate and interpret correctly.
6. Distinguish between the marginating and circulating pools of leukocytes.
7. Recognize the cytokines responsible for white blood cell differentiation from pluripotent stem cells.
8. Describe the lymphatic system and its relationship to lymphocyte production.
9. Describe the role of stimulated and un-stimulated lymphocytes.
10. List the lymphocytic subpopulations.

Chapter 10: Abnormalities of White Cells: Quantitative, Qualitative, and the Lipid Storage Diseases

1. Recall the physiology and function of granulocytes.
2. Describe the steps involved in phagocytosis.
3. Identify conditions that cause a quantitative increase or decrease in a particular white cell line.
4. Describe the changes observed when white cells respond to infection.
5. Identify the acquired and inherited qualitative changes in the white cell.
6. Identify conditions that lead to hyposegmentation or hypersegmentation of the segmented neutrophils.
7. Define the differences seen in an adult's versus a child's lymphocyte count.
8. Interpret the effects of chemotherapy on a patient's relative or absolute white blood cell count and correctly calculate both.
9. Recall the reactive symptoms of infectious mononucleosis and cytomegalovirus.
10. Define white cell-related terms such as *leukocytosis, left shift, leukemoid reaction,* and *leukoerythroblastic reaction*.
11. Describe the lipid storage diseases, such as Gaucher's, Niemann-Pick, and Tay-Sachs diseases.

Chapter 11: Acute Leukemias

1. Compare and contrast acute versus chronic leukemia with respect to age of onset, presenting symptoms, and organ involvement.
2. Describe acute leukemia with emphasis on symptoms, peripheral smear finding, and bone marrow findings.
3. Describe the World Health Organization (WHO) classification for acute myeloid leukemias and related myeloid proliferations.
4. Describe how cytochemical staining can aid in the diagnosis of acute leukemias.
5. Identify the cell produced in both the lymphoid and myeloid cell lineages.
6. List the most pertinent CD markers for various acute leukemias.
7. Describe acute lymphocytic leukemia with emphasis on age of onset, symptoms at presentation, prognosis, laboratory findings and WHO nomenclature of classification.
8. Identify the criteria used to diagnose AML.
9. Desribe the different lymphocyte subpopulations, their CD markers, normal ratios and percentages.

Chapter 12: Chronic Myeloproliferative Disorders

1. Define the term myeloproliferative disorders.
2. Discuss the pathogenesis of the myeloproliferative disorders.
3. Identify the major cell lines involved with myeloproliferative disorders.
4. Identify and differentiate clinical features and laboratory features associated with the chronic myeloproliferative disorders.
5. Identify and describe the peripheral and bone marrow abnormalities associated with the chronic myeloproliferative disorders.
6. Compare and contrast the clinical laboratory features of chronic myeloproliferative disorders.
7. Identify the diagnostic criteria for the chronic myeloproliferative disorders.
8. Discuss the treatment of and prognosis for the chronic myeloproliferative disorders.

Chapter 13: Lymphoproliferative Disorders and Related Plasma Cell Disorders

1. Define the common features of the chronic lymphoproliferative disorders.
2. Describe the symptoms, peripheral smear morphology, and treatment of individuals with chronic lymphocytic leukemia.

3. Describe the pertinent features of hairy cell leukemia to include clinical presentation, peripheral smear, and pertinent cytochemical stains.
4. Define the clinical features of Sezary syndrome.
5. Describe the basic immunoglobulin unit.
6. List the laboratory criteria used to diagnose the monoclonal gammopathies.
7. Differentiate the clinical and laboratory features that distinguish multiple myeloma and Waldenstrom's macroglobulinemia.

Chapter 14: The Myelodysplastic Syndromes

1. Outline the possible causes of the MDSs.
2. Discuss the major cellular morphological abnormalities associated with MDSs.
3. Discuss the management of the MDSs.

Chapters 15-19 will be covered in MLAB 1127 – Coagulation

Week	Date	Lecture Material	Assigned Reading	*Labs /Assignments*	Exams / Quizzes
1	Jan 11/12	Review Syllabus / Orientation Ch. 1: Introduction to Hematology and Basic laboratory Practices Ch. 2: From Hematopoiesis to the Complete Blood Count	Ch. 1 Ch. 2 **Study Questions Due Jan. 21st**	*Virtual Lab: RBC Morphology Checklist* ***Three lab safety videos are to be done by new students – Biosafety 1, Biosafety 2, Biosafety 3***	*Lab Safety Quiz –* *All students must obtain a 100%.*
1	Jan 13/14	Ch. 3 RBC Production, Function, and Relevant Red Cell Morphology Ch. 4: Hemoglobin Function and Principles of Hemolysis **Zoom Review for Exam 1: January 14th at 12pm**	Ch. 3 **Study Questions Due Jan. 21st** Ch. 4 **Study Questions Due Jan. 21st**	*MediaLabInc.Net –* **-Red Blood Cell (RBC) Morphology** **-Red Blood Cell (RBC) Indices: Definitions and Calculations** **Username example: 11632aiflynn**	
2	***No School Jan 18 – Happy MLK Day*** Jan 19	Ch. 5: The Microcytic Anemias	Ch. 5 **Study Questions Due Jan. 25th**	*Tuesday, Group 1:* *Lab 1: RBC Morphology* *Lab 2: Microhematocrit – Manual Method* *Lab 3: Slide Making & Staining* *Lab 4: WBC and PLT Estimates*	
2	Jan 20/21	Ch. 6: The Macrocytic Anemias **Zoom Review for Exam 2 January 21st at 2pm**	Ch. 6 **Study Questions Due Jan. 25th**	*Wednesday, Group 2:* *Lab 1: RBC Morphology* *Lab 2: Microhematocrit – Manual Method* *Lab 3: Slide Making & Staining* *Lab 4: WBC and PLT Estimates*	**Exam 1 – Chap 1-4, Thurs., Jan. 20th at 12pm** ***-LockDown Browser with Webcam***

Week	Date	Lecture Material	Assigned Reading	*Labs /Assignments*	Exams / Quizzes
3	Jan 25/26	Ch. 7: Normochromic Anemias, Biochemical and Membrane Disorders, and Misc. RBC Disorders Ch. 8: The Normochromic Anemias Due to Hemoglobinopathies **Zoom Review for Exam 3 January 25th at 2pm**	Ch. 7 **Study Questions Due Jan. 28th** Ch. 8 **Study Questions Due Jan. 28th**	*Tuesday, Group 1:* *Lab 5: Introduction to normal white cell differentials* *Lab 6: Automation Lab (plus normal manual differentials)* *Lab 7: ESR* *Normal WBC Checklist* *MediaLabInc.Net –* **Normal Peripheral Blood Cells**	**Exam 2 – Chap 5, 6, Mon., Jan. 25th at 12pm** ***-LockDown Browser with Webcam*** **Quiz: Red Cell Morphology Wed., Jan. 25 at 12pm** ***-LockDown Browser with Webcam***
3	Jan 27/28	Ch. 9: Leukopoiesis and Leukopoietic Function	Ch. 9 **Study Questions Due Feb. 4th**	*Wednesday, Group 2:* *Lab 5: Introduction to normal white cell differentials* *Lab 6: Automation Lab (plus normal manual differentials)* *Lab 7: ESR* *Normal WBC Checklist*	**Exam 3 – Chap 7-8 Thursday, Jan. 28th at 12pm** ***-LockDown Browser with Webcam***
4	Feb 1/2	Ch. 10: Abnormalities of WBC: Quantitative, Qualitative, & Lipid Storage Diseases **Zoom Review for Exam 4 February 1st at 12pm**	Ch. 10 **Study Questions Due Feb. 4th**	*Tuesday, Group 1:* *Lab 6: Automation Lab (Plus normal manual differentials) continued* *Lab 8: Introduction to abnormal white cell differentials* *Abnormal WBC checklist* *MediaLabInc.Net –* **Variations in White Cell Morphology - Granulocytes**	

Week	Date	Lecture Material	Assigned Reading	*Labs /Assignments*	Exams / Quizzes
4	Feb 3/4	Ch. 11: Acute Leukemias	Ch. 11 **Study Questions. Due Feb. 11th**	*Wednesday, Group 2:* *Lab 6: Automation Lab (Plus normal manual differentials) continued* *Lab 8: Introduction to abnormal white cell differentials* *Abnormal WBC checklist*	**Exam 4 – Chap 9-10 Thursday, Feb 4th -LockDown Browser with Webcam** **Quiz: Normal White Cell Morphology Thursday, Feb 4th -LockDown Browser with Webcam**
5	Feb 8/9	Ch. 12: Chronic Myeloproliferative Disorders **Zoom Review for Exam 5 February 8th at 2pm**	Ch. 12 **Study Questions Due Feb. 11th**	*Tuesday, Group 1:* *Lab 8: Introduction to abnormal white cell differentials (continued)*	
5	Feb 10/11	Ch. 13: Lymphoproliferative Disorders and Related Plasma Cell Disorders	Ch. 13 **Study Questions Due Feb. 18th**	*Wednesday, Group 2:* *Lab 8: Introduction to abnormal white cell differentials (continued)*	**Exam 5 – Chap 11-12, Thursday, Feb. 11th -LockDown Browser with Webcam** **Quiz: Abnormal White Cell Morphology Wed, Feb. 11th -LockDown Browser with Webcam**

6	Feb 15/16	Ch. 14: The Myelodysplastic Syndromes **Zoom Review for Exam 6 February 15th @ 12pm**	**Ch. 14 Study Questions Due Feb. 18th**	*Tuesday, Group 1:* *Lab 9: Automation Lab (Abnormal differentials)* *CBC & Differential Practice* *Lab 10: Reticulocyte Lab*	
6	Feb 17/18	Guest Speaker – Flow Cytometry and Genetic Analysis of Leukemias Thursday, Feb 18th **YouTube Video Review for Final - Elsevier Questions**		*Wednesday, Group 2:* *Lab 9: Automation Lab (Abnormal differentials)* *CBC & Differential Practice* *Lab 10: Reticulocyte Lab*	**Exam 6 – Chapter 13-14 Thursday, Feb 18th** ***On-Campus @ 12pm***
7	Feb 22/23			**Tuesday, Group 1:** **Critical Criteria Review: CBC Checkoff**	**Exam 7 – Take Home Comprehensive Review Exam – Due March 1st**
7	Feb 24/26			**Wednesday, Group 2:** **Critical Criteria Review: CBC Checkoff**	
8	Mar 1/2	**Zoom Review for Final March 1st at 12pm**		**Tuesday, March 2nd** **Critical Criteria: CBC Checkoff (Exam 8)** **(Two Separate Groups)**	
8	**March 3**	**Final Comprehensive Exam – Exam 9 12:00 pm 2:00 pm**	**Location - TBA**		

Methods of Evaluation

LECTURE: Evaluation will be by written examinations, quizzes and assignments. In addition to several unit tests, there will be a final examination in Hematology.

CAMPUS LAB: Evaluation of these objectives may be by practical or written examination. Some skills have been designated as **CRITICAL CRITERIA**. This means that the student **MUST** be able to perform these skills according to the standards prescribed in the objectives. These skills must be performed in order for the student to progress in the MLT Program.

GRADING:

Category	*Number*	*Each Worth (%)*	*Total*
Exams	9	100%	85%
Assignments/Quizzes/Media Lab		100%	15%
Total			100%

Laboratory Exercise Portion: Must earn a 70% (C average) to earn a Pass (does not count toward point total). The critical criteria grade will count as an exam grade.

Numerical grade percentages will be equivalent to the following scale:

A = 89.5 - 100
B = 79.5 – 89.4
C = 69.5 – 79.4
D = 59.5 – 69.4
F = 59.4 or Below

Methods of Instruction

Lecture/discussion and Campus Laboratory will be correlated so that the total number of lecture and laboratory hours per week will be utilized to the best advantage.

Visual aids will be used to reinforce the presented material. Individualized instruction, lab experience, demonstrations and workshops (when available), textbooks, and periodicals will be utilized.

The student may be required to do some independent research.

ASSIGNMENTS:

1. Study the objectives listed above.
2. Specific assignments will be listed in the Lecture/Exam/Campus Lab Schedule. Additional assignments may be made by the instructor.
3. Read each chapter before coming to class.
4. Answer the study questions at the end of each chapter, as assigned. They will be part of your grade, and will be to your benefit to answer!

Course Requirements

In order to achieve a passing grade, the following requirements must be met:

1. Satisfactory Campus Lab performance. (A grade of 70% or better.)
2. An overall exam average of 70% or better.
3. Regular attendance for lecture and Campus Lab is recommended. Responsibility for work missed is placed upon the student.
4. A grade of "C" or better is required for graduation.
5. The final is comprehensive and may replace a chapter or review exam grade, whichever is the lowest.

Course & Instructor Policies

Hybrid Course Information

Communication from the instructor pertaining to ***all*** students will be provided through Canvas Announcements. Individual communications to the instructor should be made through Grayson email. Students shall communicate with each other via personal email.

Online participation will be noted through the submission of assigned video write-ups.

Special Note: Though there are no required discussion boards for this course, should an online discussion environment among students emerge, diversity has many manifestations including diversity of thought, opinion and values. I encourage all students to be respectful of that diversity and to refrain from inappropriate commentary. Should such inappropriate comments occur, I will intervene and disable student ability to utilize the discussion area. In some cases there may be academic disciplinary action. Students should be guided by common sense and basic etiquette. Never post, transmit, promote, or distribute content that is known to be illegal.

Lectures:

Power Points for each chapter of text information will be posted to Canvas and will accompany chapter questions over the material.

Quizzes

Quizzes are not always regularly scheduled but may be given at the instructor's discretion with or without prior notice.

Online Exams

Online exams will be taken through Canvas. They will have a timer set for the test to end. If a student arrives late for an exam, they will have whatever time is remaining to take the exam. If the test has expired, it will count as a missed exam.

The final test will be comprehensive. The lowest test grade of all exams (except the final) may be replaced by the final exam grade, if it is higher than an original exam grade. If it is lower, the original exam grade will remain the same. This is to accommodate unforeseeable absences (ie. illness, car trouble, etc.)

A minimum overall exam average of 70% must be obtained for completion of the course.

Assignments

Additional assignments may be given throughout the semester to aid in further understanding of the material.

Laboratory Exercises

At the conclusion of lecture or exams, the students will be allowed a ten minute break. At the end of the designated break, the students must be in the lab ready to begin. Students arriving after the break will not be allowed to stay. Extenuating circumstances will be considered by the professor.

Each laboratory exercise will have an accompanying pre-lab that is due upon arrival to the lab. It will be handed in complete before the student is allowed to proceed with the lab exercise. If a pre-lab is not submitted, the student will receive a zero for the lab exercise. The pre-labs, tours, and extra work will each count as 10% each accumulating to 100% of a separate lab grade.

Lab report forms will be filled out for each exercise. The forms will be due on Monday following the week it was performed by 300pm. No late lab reports will be accepted. Missed labs cannot be made up due to the sensitive nature of the specimens.

Satisfactory performance in the laboratory is required for successful completion of the course. This is determined by achieving at least a 70% average. This will award the student a Pass for the lab component of the course, though the points will not be included in the final grade calculation. They are used only to determine satisfactory or unsatisfactory performance in the lab. Students who are unable to earn at least a 70% average from the lab portion will receive a Fail, and a failing grade for the course.

Dress Code Adherence

Students are expected to adhere to the program dress code for all scheduled class days. Students not following the dress code, as determined by the instructor and program policy, will be dismissed from class for the day. This will apply to laboratory and all exam days as well. Extenuating circumstances will be considered and determined by the instructor.

Electronic Devices

Cell phones must be placed on silent for all lectures and tests. If a student must leave the room to answer a call, they should leave and return as quietly as possible with minimum distraction to instructor and fellow students. If cell phone usage becomes excessive, further disciplinary action will be taken by the instructor.

Laptop computers and iPads may be brought to class to type lecture notes and are to be used for this purpose only. The student may be removed from class if the policy is abused. Any non-class websites may be accessed during class breaks only.

Computer/Internet Problems

Students **must** have contingency plans for computer and Internet problems. Some suggestions include becoming familiar with Internet/free PC usage within your community, or seeking out friends, family, and even coworkers who have Internet services. It is your responsibility to have a backup plan for PC and Internet failure.

*PC and Internet failure is ****not***** an excuse to turn in late assignments or for not accessing the week's PowerPoint.*

Late Work

Late assignments will be accepted through the next Monday with a 25% deduction off the grade. After this time has passed, the assignment will not be accepted. Notify the instructor if an extenuating circumstance arises before the assignment is due so that other arrangements can be made. Notifying the instructor afterwards is unacceptable.

Study Strategies for Students

Each unit of instruction follows a set of learning objectives found within the syllabus. Students, who demonstrate a thorough knowledge of the learning objectives, should score well on exams.

I recommend the objectives be answered during test preparation. It is highly recommended that students attend all lab sessions, pay close attention to instructions, follow procedures, and participate to the fullest extent. It is generally accepted that you will be studying for this (or any MLT course) for one-and-a-half to twice the number of credit hours as the course. For example: MLAB1315 Hematology is a three hour class and will need approximately four-and-a-half to six hours of study time per week.

Students should not wait until the night before an exam to study. Studies have shown that students who study a certain amount each day are more likely to be successful. It is recommended that students read lecture material before a lecture is given, define unknown terms and prepare questions to ask the instructor during the lecture. Immediately after a lecture, the student should reread the lecture material and answer learning objectives as if they were study questions.

Tutoring is available to all students for lectures and labs in a course. It is the student's responsibility to file a request for a tutor in the Testing Center, and an appropriate tutor will be located. It is imperative that students request tutoring as soon as the need develops. Do not wait until the last minute to begin needed work. Tutoring for lecture or lab will be scheduled outside of regular class meetings.

Course Attendance and Participation

Academic success is closely associated with regular classroom attendance and course participation.
All successful students, whether on campus or online, are expected to be highly self-motivated.
All students are required to participate in courses regularly and are obliged to participate in class activities and complete and submit assignments following their professors' instructions. Students taking courses during compressed semester time frames such as mini-mester, summer sessions, and mid-semester should plan to spend significantly more time per week on the course. Responsibility for work missed because of illness or school business is placed upon the student. More than two (2) absences are considered to be excessive. In addition, students' eligibility to receive financial aid or live in a College dormitory can be affected by withdrawal from courses. When withdrawal occurs, any tuition refund would be made in accordance with state regulations
The instructor will be taking note of an additional attendance record of the labs.
If a student fails to attend more than five of the required lab periods.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the college's policy on plagiarism (see GC Student Handbook for details). Grayson College subscribes to turnitin.com, which allows faculty to search the web and identify plagiarized material.

Plagiarism is a form of scholastic dishonesty involving the theft of or fraudulent representation of someone else's ideas or words as the student's original work. Plagiarism can be intentional/deliberate or unintentional/accidental. Unintentional/Accidental plagiarism may include minor instances where an attempt to acknowledge the source exists but is incorrect or insufficient. Deliberate/Intentional plagiarism violates a student's academic integrity and exists in the following forms:

- Turning in someone else's work as the student's own (such as buying a paper and submitting it, exchanging papers or collaborating on a paper with someone else without permission, or paying someone else to write or translate a paper)
- Recycling in whole or in part previously submitted or published work or concurrently submitting the same written work where the expectation for current original work exists, including agreeing to write or sell one's own work to someone else
- Quoting or copy/pasting phrases of three words or more from someone else without citation, • Paraphrasing ideas without citation or paraphrasing incompletely, with or without correct citation, where the material too closely matches the wording or structure of the original
- Submitting an assignment with a majority of quoted or paraphrased material from other sources
- Copying images or media and inserting them into a presentation or video without citation,
- Using copyrighted soundtracks or video and inserting them into a presentation or video without citation
- Giving incorrect or nonexistent source information or inventing source information
- Performing a copyrighted piece of music in a public setting without permission
- Composing music based heavily on someone else's musical composition.

Campus Lab

Terminal Performance Objectives (Affective, Cognitive and Psychomotor Domains): Upon completion of the assignments and practice in Campus Lab the student should:

1. Demonstrate a willingness to prepare for the role of MLT by:
    a. arriving for campus lab sessions at the assigned time
    b. observing safety rules and regulations
    c. keeping records
        1). legibly recording results
        2). recording results exactly as determined
    d. cooperating with the instructor and fellow students to maintain the campus lab and equipment in good condition
2. Demonstrate the ability to perform laboratory tests by
    a. following written and verbal instructions
    b. demonstrating increasing dexterity in the performance of manual procedures
    c. demonstrating progressive accuracy, precision and speed
    d. obtaining results within the limits set for each test
3. Demonstrate a knowledge of theoretical concepts involved in the tests performed in campus lab by:
    a. recognizing results which do not correlate and reporting them to the instructor
    b. associating unusual test results with the condition or disease which might be indicated
4. Perform three (3) out of four (4) consecutive CBCs so that the results meet the criteria listed in the section on evaluation. This is designated as CRITICAL CRITERIA.

Campus Lab Evaluation

Campus Lab Report forms will be completed for each procedure performed. These will be graded for part of the Campus Lab grade. The following items will be used to evaluate the achievement of the objectives:

1. Campus Lab Report Forms (Includes results)
2. Observation of safety rules (Helps prevent accidents and infections)
3. Quizzes (Tests recall of specific facts)
4. Lab Exercise Pre-Labs (Prepares student for each lab exercise)

Evaluation of the Hematology objectives may be by practical or by written examination. The complete blood count (CBC) has been designated as CRITICAL CRITERIA. This means that the student **MUST** be able to perform a CBC within the limits stated in the

criteria below. Each of the tests listed below will be evaluated by formative means. When the student is able to perform each test within the criteria listed, all tests will then be included in the evaluation of the CBC. When the student has performed a CBC meeting the criteria on three (3) of four (4) CBCs.

Red blood cell morphology and platelet numbers/morphology **MUST** be evaluated when performing a differential cell count.

Other hematology tests performed in Campus Lab will be evaluated by formative means. All supplies and reagents will be furnished. Instructions and pre-lab questions for each lab exercise will be provided via Canvas. You must complete a pre-lab portion of each lab exercise in order to perform the lab and receive credit. These will be graded as part of your Campus Lab grade.

INFECTION CONTROL PROCEDURES FOR GRAYSON COLLEGE MLT PROGRAM CAMPUS LAB

* **OBJECTIVE**: After a review of the following material and the Infection Control Procedures for Grayson College MLT Program Campus Lab, the student will practice established safety rules in Campus Lab.

Each laboratory will vary somewhat in established routines, but for the most part all have the same goal. It is essential that all procedures be conducted in a reliable manner.

Personal safety is of the utmost importance. Because many of the clinical specimens may contain highly pathogenic microorganisms, especially viruses, the laboratory can be a hazard to health unless certain rules of conduct are observed. Strict observance of safety rules is mandatory and will minimize exposure to blood-borne pathogens.

1. Hand-to-mouth exposure cannot be overemphasized. If hands are contaminated with blood or reagents, serious illness can be the result. The best rule to follow is never to allow the hands to come in contact with the mouth, face or eyes while conducting procedures.

    a. Smoking is strictly prohibited in the laboratory.

    b. Foods and beverages are not allowed in the laboratory area during labs.

    c. Hands should be thoroughly washed with a disinfectant soap immediately after the completion of any laboratory work.

    d. Mouth pipetting is not allowed.

    e. Closed-toe shoes are mandatory in all laboratory exercises as they also reduce the risk of exposure.

f. Occasionally a container of blood or serum may be spilled or broken. Disinfectant procedures should be accomplished immediately and the incident reported to the instructor.

1) Cover the spill with paper towels.

2) Soak the paper towels with disinfectant and allow to stand for 20-30 minutes.

3) Wipe up the spill and clean the area with disinfectant.

4) If broken glass is involved, be care full not to cut your hands.

2. Face shields or safety shields may be used to avoid aerosols.

3. Protective clothing such as buttoned laboratory coats or aprons are essential. The items should be removed when leaving the laboratory for any reason. Gloves should be disposed of in biohazard bags after they have been used.

4. Contaminated materials and samples of blood should be placed in an appropriate container and discarded into a 3CI Box for disposal.

5. Care of all work space and equipment and the maintenance of cleanliness is essential to avoid contaminating laboratory personnel. Bench spaces should be cleaned at the end of each lab session with a suitable disinfectant.

Proper laboratory conduct is really common sense, but its importance cannot be over-emphasized. Many laboratory workers have become seriously infected because the few simple rules of good conduct in the laboratory have not been followed.

NOTES:

1. Each student must complete individual lab sessions. It is very important not to get behind.
2. If a student completes the lab session early, the extra time may be utilized in various activities. Each student is expected to use each Campus Lab session to its full advantage.
   a. Available computer programs
   b. Complete result form for Lab Exercise
   c. Complete Review Questions in textbook
   d. Read Journals, magazines & papers
3. Breaks of reasonable length may be taken as needed during Campus Lab sessions.

LABORATORY SAFETY

* **OBJECTIVE**: After a review of the following material and the Infection Control Procedures for Grayson College MLT-AAS Program Campus Lab, the student will practice established safety rules in Campus Lab.

Personal safety is of the utmost importance. Because many of the clinical specimens may contain highly pathogenic microorganisms, especially viruses, the laboratory can be a hazard to health unless certain rules of conduct are observed. Strict observance of safety rules is mandatory and will minimize exposure to bloodborne pathogens.

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4. Contaminated materials and samples of blood should be placed in an appropriate containers.

5. Care of all work space and equipment and the maintenance of cleanliness is essential to avoid contaminating laboratory personnel. Bench spaces should be cleaned at the beginning and end of each lab session with a suitable disinfectant.

Proper laboratory conduct is really common sense, but its importance cannot be overemphasized. Many laboratory workers have become seriously infected because the few simple rules of good conduct in the laboratory have not been followed.

TITLE IX:

GC policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status.

Furthermore, Title IX prohibits sex discrimination to include sexual misconduct: sexual violence (sexual assault, rape), sexual harassment and retaliation.

For more information on Title IX, please contact:

- Dr. Molly M. Harris, Title IX Coordinator (903)463-8714
- Ms. Logan Maxwell, Title IX Deputy Coordinator - South Campus (903) 415-2646
- Mr. Mike McBrayer, Title IX Deputy Coordinator - Main Campus (903) 463-8753
- Website: http://www.grayson.edu/campus-life/campus-police/title-ix-policies.html
- GC Police Department: (903) 463-8777- Main Campus) (903-415-2501 - South Campus)
- GC Counseling Center: (903) 463-8730
- For Any On-campus Emergencies: 911

Grayson College campus-wide student policies may be found on our Current Student Page on our website: http://grayson.edu/current-students/index.html

Grayson College is not responsible for illness/injury that occurs during the normal course of classroom/lab/clinical experiences.

These descriptions and timelines are subject to change at the discretion of the Professor.

Grayson College campus-wide student policies may be found in each Canvas course shell under the menu item "Student Resources".

Written: *Aimee Flynn*
December 15, 2020