



## Course Syllabus

### **MLAB 1235- Immunology/Serology**

*Revision Date: 9/13/16*

**Catalog Description:** An introduction to the theory and application of basic immunology, including the immune response, principles of antigen-antibody reactions, and the principles of serological procedures as well as quality control, quality assurance, and safety.

**Lecture hours =2, Lab hours = 1**

**Prerequisites:** Enrollment in this course and the Medical Laboratory Technology Program requires department head approval and successful completion of the admissions process. Students must be accepted into the MLT Program.

**Semester Credit Hours: 2**

**Lecture Hours per Week: 2**

**Lab Hours per Week: 1**

**Contact Hours per Semester: 80**

**State Approval Code: 5110040000**

**Instructional Goals and Purposes:** The purpose of this course is to develop a working knowledge of the principles and procedures of immunology and serology.

#### **Learning Outcomes:**

1. Apply principles of safety, quality assurance and quality control in Immunology/Serology.
2. Evaluate specimen acceptability
3. Describe the principles involved in the immune response.
4. Identify the structure, function, and characteristics of immunoglobulins.
5. Explain the principles of and perform serological tests.
6. Evaluate and correlate test results with associated diseases or conditions.

#### **Specific Course Objectives (includes SCANS):**

After studying all materials and resources presented in the course, the student will be able to:

1. **Chapter 1 (1a-i, ii, iv, v, 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
  - a. Define immunology, immunity, antigen, humoral, serum, and plasma.
  - b. Compare and contrast the external and internal innate defense systems.
  - c. Compare and contrast innate immunity and acquired immunity.
  - d. Define the functions of :
    - neutrophils
    - eosinophils
    - basophils
    - mast cells
    - monocytes
    - macrophages
    - dendritic cells
  - e. List the different names for macrophages as they reside in different tissues.

- f. Describe phagocytosis and list cells that perform it.
  - g. Discuss the role of the thymus in T cell maturation.
  - h. Discuss differentiation and maturation of B cells.
  - i. Explain what a CD marker is.
  - j. Define human leukocyte antigen (HLA) and major histocompatibility complex (MHC).
  - k. Explain how natural killer cells differ from cytotoxic T cells.
- 2. Chapter 2 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the basic structure of an immunoglobulin.
  - b. Define hinge region.
  - c. Explain electrophoresis patterns.
  - d. Describe the difference between polyclonal and monoclonal.
  - e. Describe myeloma protein and explain how it is used to aid immunologists.
  - f. Differentiate the five immunoglobulin types found in humans.
  - g. Describe a Bence Jones protein.
  - h. Compare and contrast primary and secondary immune response.
  - i. Describe how a monoclonal antibody is produced.
- 3. Chapter 3 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Define and describe the basic requirements for immunogenicity.
  - b. Define and describe antigen, immunogen, and antigenic determinant or epitope.
  - c. Describe the major role of MHC components in an immune response and the specific roles that MHC class I and class II molecules play in the response.
  - d. Explain what a haplotype is in regard to inheritance of major histocompatibility complex (MHC) antigens.
  - e. Compare and contrast a linear versus a conformational epitope.
  - f. Describe what a hapten is and how it helped define the specificity of the immune system.
  - g. Describe what a carrier is.
  - h. Discuss the factors of immunogenicity.
  - i. Describe adjuvant and list examples.
  - j. Define cross-reactivity and its effect on assays and responses.
  - k. Describe the structure of the T-cell receptor and its associated components.
  - l. Describe the major steps in antigen processing and presentation by an antigen-presenting cell.
- 4. Chapter 4 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. List and describe the general features of cytokines.
  - b. Compare and contrast the role of helper T cells and cytotoxic T cells after antigen presentation.
  - c. Describe the function of IL-2 as a cytokine prototype.
  - d. Describe laboratory assays to measure T-cell function.
  - e. Describe assays for cytokines.
  - f. Differentiate among and define the terms autocrine effect, paracrine effect, and endocrine effect.
  - g. Describe and compare the different classes of cytokines based on their function.
  - h. Describe the function of cytokines involved in innate immunity.
  - i. Describe the function of cytokines involved in adaptive immunity.
- 5. Chapter 5 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the classical pathway of complement activation in terms of C1 and its subunits; C4 and its subunits; C2 and its subunits; and C3 and its subunits, C5, C6, C7, C8, and C9.
  - b. For the alternative complement pathway, list the activating substances for initiation of this system and describe the role of C3b, factor B, factor D, properdin, factor H, and factor I in this pathway.
  - c. Describe the three different functions—recognition, activation, and membrane attack—of each of the three pathways.
  - d. Discuss the synthesis and composition of complement.
  - e. Describe regulators of the complement system, both fluid phase and membrane bound.

Name and describe the functions of the subunits that are anaphylatoxins and chemotaxins as well as those that are involved in immune adherence and in opsonization.

- f. Describe the laboratory method and the controls for the following assays involving complement: complement immunoassays, complement activity measurements, CH50, and AH50. In addition, describe why serum is used rather than plasma for complement assays.
- g. Name and describe the functions of the subunits that are involved in (1) the production of inflammatory mediators, (2) B-cell activation, and (3) memory.

**6. Chapter 9 (1a-i, ii, iv, v, 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. List and describe the four types of hypersensitivity reactions.
- b. Compare and contrast the role of antibody (and their different immunoglobulin classes), T cells, macrophages, neutrophils, and complement in each of the hypersensitivity reactions described. Be sure to know the numerical number associated with each hypersensitivity type.
- c. Define the terms hypersensitivity, allergy, and allergen.
- d. Describe the roles of IgE, cross-linking, and mast cells in type I hypersensitivity.
- e. Describe the roles of antibody and complement in type II hypersensitivity.
- f. Describe the roles of immune complexes, complement, and phagocytes in type III hypersensitivity.
- g. Diagnose each form of hypersensitivity from clinical manifestations.
- h. Give an example of a clinical condition that is characteristic of each form of hypersensitivity.
- i. Describe clinical and laboratory methods used to detect and/or evaluate hypersensitivity
- j. Describe prophylactic and therapeutic approaches for each type of hypersensitivity.
- k. Discuss different types of intervention in type I hypersensitivity including environmental, pharmacological, and immunological (hyposensitization and desensitization).
- l. Understand the situation/danger when an Rh-negative mother is carrying an Rh-positive child.
- m. Categorize the mediators released from basophils and mast cells when an allergic reaction takes place.
- n. Describe other things that can cause mast cell degranulation.

**7. Chapter 10 (1a-i, ii, iv, v, 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Discuss the role of genetics, gender, and environmental factors in the etiology of autoimmunity.
- b. Describe the mechanisms of immunopathology that cause disease in autoimmunity.
- c. Describe the etiology of systemic lupus erythematosus and its clinical manifestations.
- d. List and describe different tests for the diagnosis of systemic lupus erythematosus.
- e. Describe the etiology of rheumatoid arthritis and its clinical manifestations.
- f. Describe the cellular and molecular mechanisms of immunopathology and tissue destruction in rheumatoid arthritis.
- g. Name and describe different diagnostic tests for the diagnosis of rheumatoid arthritis.
- h. Name and describe laboratory tests that are common to different systemic autoimmune diseases.
- i. Discuss the basic immunological mechanisms that may cause autoimmunity.
- j. Describe possible biological mechanisms that may lead to systemic lupus erythematosus.

**8. Chapter 11 (1a-i, ii, iv, v, 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Define organ-specific autoimmunity.
- b. Compare the clinical presentation and causes and effects of autoimmune thyroid diseases.
- c. Describe the biological assays used in the diagnosis of autoimmune hyperthyroidism.
- d. Discuss the causes and effects of type 1 diabetes and describe the metabolic abnormalities associated with type 1 diabetes.
- e. Discuss the diagnosis and management of type 1 diabetes.
- f. Describe the causes and effects of celiac disease.
- g. Discuss the role of a gluten-free diet in the management of celiac disease.
- h. Compare and contrast ulcerative colitis and Crohn's disease.
- i. Discuss autoantibodies associated with inflammatory bowel disease.
- j. Describe the causes and effects of myasthenia gravis.
- k. Discuss the autoantibodies associated with myasthenia gravis.

- l. Describe the clinical spectrum associated with the diagnosis of multiple sclerosis.
- m. Describe the causes and effects of Goodpasture's disease.
- n. Describe the clinical presentation of primary adrenal failure.
- o. Describe the presentation of autoimmune gonadal failure in women and men.
- p. Discuss the causes and effects of pernicious anemia.
- q. Discuss the diagnostic signs associated with pernicious anemia and the autoantibodies associated with the disease.
- r. Discuss the causes and effects of antiphospholipid syndrome.

**9. Chapter 12 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Define and explain benign, malignant, invasive, metastasis, cancer, carcinoma, adenocarcinoma, sarcoma, leukemia, lymphoma, myeloma, grade, and stage.
- b. Define tumor immunology and tumor-associated antigens.
- c. State the potential clinical uses for tumor associated antigens.
- d. State the use for and limitations of Bence-Jones proteins, immunoglobulin, AFP, hCG, PSA, CA-125.
- e. Discuss the difference between active and passive immunotherapy.
- f. Describe active immunotherapy for cancer.
- g. Describe immunosurveillance.
- h. Discuss staging.

**10. Chapter 13 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Compare and contrast lymphoma and leukemia.
- b. Compare and contrast Hodgkin's and non-Hodgkin's lymphoma.
- c. Describe plasma cell dyscrasias including monoclonal gammopathy of undetermined significance.
- d. Describe myelomas in terms of monoclonal versus polyclonal gammopathy, diagnosis, hyperviscosity, Bence-Jones proteins, organ damage, skeletal system damage, suppression of other Igs, and prognosis.
- e. Describe heavy chain disease.
- f. Describe light chain disease.
- g. Describe macroglobulinemia in terms of categorization as a lymphoma, electrophoresis pattern, hyperviscosity and associated changes, rouleaux formation, organ changes, amyloidosis, and cryoglobulin.
- h. Describe serum protein electrophoresis patterns of myeloma and macroglobulinemia.
- i. Describe immunofixation electrophoresis.
- j.

**11. Chapter 14 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Describe the role of the ABO and Rh systems in blood transfusions.
- b. Describe the ABO relationships (i.e., who can give and who can receive) between blood donors and recipients.
- c. Differentiate between autograft, isograft, allograft, and xenograft.
- d. List and describe the immunological mechanisms of graft rejection and their clinical manifestation.
- e. Describe graft-versus-host disease.
- f. Describe the different methods used for HLA typing.

**12. Chapter 15(1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**

- a. Differentiate primary and secondary immunity.
- b. Describe the mechanisms and clinical manifestation of immunodeficiencies involving antibody production (B cells).
- c. Describe the mechanisms and clinical manifestation of immunodeficiencies involving T-cell defects.
- d. List and describe the mechanisms of immunodeficiencies resulting from defects in the complement system.

- e. Describe different mechanisms of immunodeficiency involving phagocytes and their clinical implication
  - f. List and describe therapeutic approaches to different forms of immunodeficiency.
- 13. Chapter 16 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the different methods of transmission of HIV.
  - b. Identify the human cells targeted by HIV.
  - c. Describe the immune response of the host to HIV.
  - d. Describe the effect of HIV infection on the immune system and the development of AIDS.
  - e. Describe the confirmatory test for HIV detection.
  - f. Give examples of opportunistic infections commonly found in AIDS patients.
  - g. Describe current treatments for HIV and AIDS.
- 14. Chapter 17 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the symptoms of hepatitis.
  - b. Compare and contrast the Hepatitis Viruses in terms of transmission and epidemiology.
  - c. Describe the hepatitis A and B vaccines.
  - d. Explain the vaccinations for hepatitis B and hepatitis A.
  - e. Understand the infection risks associated with patients who have the various hepatitis viruses for laboratory and personal safety. Describe what these are for each type of hepatitis.
  - f. Describe the relationship between HBV and HBD (delta).
  - g. Describe the assays that would allow for the differentiation of a chronic carrier of hepatitis B from a patient with an acute hepatitis B infection.
  - h. Explain which antibody indicates hepatitis B virus infection resolution.
  - i. Describe common forms of HCV transmission
- 15. Chapter 18 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the similarities of the viruses of the Herpesviridae family.
  - b. Discuss Epstein-Barr virus (EBV) in terms of virus type, infection course, immunity, and population affected.
  - c. Describe how an infectious mononucleosis diagnosis is made.
  - d. Describe the etiology of cytomegalovirus (CMV) in terms of host range and viral family.
  - e. Describe the different routes of CMV infection and delineate the fluids that contain CMV.
  - f. Discuss the effects of a congenital CMV infection.
  - g. Compare and contrast the clinical signs and symptoms of CMV in a healthy individual, a pregnant woman, a newborn, and an immunocompromised individual.
  - h. Discuss the immunological effects of CMV.
  - i. Define "herd immunity."
  - j. Describe the etiology and epidemiology of rubella and rubeola infection.
  - k. Explain the signs and symptoms of acquired and congenital rubella infection.
  - l. Compare the immunological manifestations of acquired and congenital rubella infections.
  - m. Define MMR
  - n. Describe laboratory diagnosis of varicella.
  - o. Describe the difference between a primary infection with varicella zoster and a reactivation.
  - p. Define toxoplasmosis, other infections, rubella, cytomegalovirus, and herpes simplex virus (TORCH).
  - q. Describe the signs and symptoms of mumps.
  - r. Describe the composition of the influenza virus.
  - s. Describe the signs and symptoms of West Nile virus infection.
  - t. Describe the varicella zoster vaccine.
- 16. Chapter 19 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe various mechanisms of immune response to bacteria and their antigens.
  - b. Discuss different approaches by which bacteria evade or downregulate the host immune responses against them.
  - c. Describe the classification of hemolytic streptococci and the different patterns of hemolysis.

- d. List and describe different clinical conditions associated with *Streptococcus pyogenes* including clinical presentation, diagnosis, and treatment.
  - e. List and describe different laboratory approaches for the detection of streptococci.
  - f. Describe the pathological effects of *Helicobacter pylori* and laboratory tests used to detect it.
  - g. Discuss how *Mycoplasma pneumoniae* is different from other microorganisms.
  - h. List and discuss the different rickettsial diseases and their causative organisms.
  - i. Discuss different serology and diagnostic tests for the detection and diagnosis of rickettsial diseases.
  - j. Describe clinical situations that favor the overgrowth of *Clostridium difficile* and discuss the clinical implications associated with its overgrowth.
  - k. List and describe laboratory tests for the detection of *Clostridium difficile*.
  - l. Describe microbiological features of spirochetes.
  - m. Discuss the host immune response to *Treponema pallidum*.
  - n. List and describe the different clinical stages of syphilis.
  - o. List and describe diagnostic tests for syphilis.
  - p. List methods of prevention and treatment for syphilis.
  - q. Describe clinical features and immunopathology of Lyme disease.
  - r. Describe the tick that transmits *Borrelia burgdorferi*, which causes Lyme disease, and the mode of disease transmission.
  - s. 19. List and describe clinical diagnostic methods for Lyme disease.
  - t. 20. List and describe different laboratory tests for Lyme disease.
- 17. Chapter 21 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the disease caused by the Epstein-Barr Virus (EBV).
  - b. Describe the host defense mechanism the body uses to fight EBV.
  - c. Describe the influenza viruses including structural proteins.
- 18. Chapter 22 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Define retrovirus.
  - b. Explain the mechanism HIV uses to attack the host.
  - c. Describe the serological tests available for screening and confirmatory testing of HIV.
- 19. Chapter 23 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe transcription.
  - b. Name the 4 DNA bases
  - c. Define hybridization and describe its role in the function of nucleic acid probes.
  - d. List the analytes each are used to detect: dot blot, Southern blot, and Northern blot.
  - e. Explain hybridization.
  - f. Discuss the use of microarrays (gene chips) and their advantage over other techniques.
  - g. Describe the principle of target amplification using the polymerase chain reaction (PCR).
  - h. Explain the overall concept of PCR.
- 20. Chapter 24 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Name the definitive host for *Toxoplasma gondii*.
  - b. Describe the amebas- *Acanthamoeba* sp and *Naegleria fowleri* including sites for entry, infections caused and common environments.
  - c. Describe the host for infection with *Plasmodium* sp.
- 21. Chapter 25 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Explain the onset of Diabetes mellitus.
  - b. Describe the causes and manifestations of Rheumatoid arthritis, Pernicious anemia, and Graves disease.
- 22. Chapter 26 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- a. Describe the three tumor associated antigens in your text including composition and their role in monitoring various tumors.
  - b. Define lymphoma.

- c. Name the classification system for leukemias.
- 23. Chapter 27 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- Identify the antibody classes that activate the classical pathway of complement.
  - Describe the categories of primary immunodeficiency disorders including general description and rate of occurrence.
  - Describe Chediak Higashi syndrome including the underlying cause.
  - List extrinsic factors that cause secondary immunodeficiency.
- 24. Chapter 28 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2c-i, ii, iii, iv.)**
- Identify the antibody classes that activate the classical pathway of complement.
  - Define Hypersensitivity Reaction.
  - Give examples of EACH type of Hypersensitivity Reaction (I, II, III, IV).
- 25. Lab #1 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2b-i, ii, iv, v, vi. 2c-i, ii, iii, iv.)**
- Define multivalent antigen.
  - Understand and identify the different reactions of identity on an ouchterlony plate.
  - Define "identity", "partial identity", and "non-identity" as they relate to ouchterlony reactions.
  - Define antibody excess zone.
  - Define antigen excess zone.
  - Describe the purpose of the humidity incubation chamber in the ouchterlony experiment.
  - Identify the media used in ouchterlony experiments.
  - Define precipitation as it relates to ouchterlony.
- 26. Lab #2 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2b-i, ii, iv, v, vi. 2c-i, ii, iii, iv.)**
- Name the hormones related to pregnancy.
  - Name the female reproductive hormones and their role in the fertility cycle.
  - Understand and demonstrate use of an automatic pipettor- including what each "stop" does and the correct way to draw up and dispense liquid.
  - Describe the concept of ELISA.
  - Know what the acronym ELISA stands for.
  - Describe the purpose of using controls in any test.
  - Understand the procedure to follow when one or more of the test controls "fail."
  - List at least three analytes that are commonly tested for using ELISA.
  - Describe the antigen-antibody reaction.
  - Describe the role of the second antibody (conjugate) and the substrate in ELISA.
- 27. Lab #3 (1a-i, ii, iv, v. 1b-ii, iii, iv, v, vi. 1c-ii, iv, v. 2a-iii. 2b-i, ii, iv, v, vi. 2c-i, ii, iii, iv.)**
- Describe hemagglutination.
  - Define endpoint or titer.
  - Evaluate serial dilutions, grading reactions and determine endpoint.
  - Name 3 tests in which finding the "titer" of an antibody is useful.
  - Describe proper "shaking for hemagglutination" technique and why it is important.
  - Define serial dilution.
  - Differentiate between antibody and antigen, including the location of each in blood.
  - Understand and complete serial dilution sequences mathematically.

**Course Content:**

A general description of lecture/discussion topics included in this course are listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

**Methods of Instruction/Course Format/Delivery:** This is a mainly online course so it will require a lot of outside proactive work by the student. The instructor will provide guidance as needed. The student will be evaluated by assignments, quizzes, cases, and exams as assigned by the instructor outside of the

classroom. The student will be required to come to a Panola College testing Center to take all major examinations. Laboratories will take place on three pre-determined Saturdays during the semester and will be mandatory. During the laboratories the students will be evaluated by case studies, in-lab assignments, and lab practicals as assigned by the instructor.

**Major Assignments / Assessments:**

The following items will be assigned and assessed during the semester and used to calculate the student's final grade.

**Assignments**

1. Case Studies
2. Chapter Quizzes
3. Pre lab Quizzes
4. Post Lab Quizzes

**Assessment(s):**

1. 3 Major Exams
2. Final Exam

**Course Grade:**

The grading scale for this course is as follows:

- Lecture Grade = 2/3 of grade
- Lab Grade = 1/3 of grade

**Lecture**

- Major Exams 50%
- Quizzes 15%
- Homework Assignments 20%
- Final Exam 15%

**Laboratory**

- Pre-Lab Quizzes 10%
- Case Assignments 20%
- In-Lab Assignments 20%
- Practical 50%

**Texts, Materials, and Supplies:**

- Rittenhouse- Olson. (2013). *Contemporary Clinical Immunology and Serology*. Saddle River, NJ: Pearson. ISBN: 978-0-13-510424-8

**Required Readings:**

- Required Text
- All information given in Canvas

**Recommended Readings:**

- Medical Dictionary
- [www.labtestsonline.org](http://www.labtestsonline.org)

**Other:**

- For current texts and materials, use the following link to access bookstore listings:  
<http://www.panolacollegestore.com>



- For testing services, use the following link: <http://www.panola.edu/elearning/testing.html>
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to <http://www.panola.edu/student-success/disability-support-services/> for more information.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook, *The Pathfinder*: <http://www.panola.edu/student-success/documents/pathfinder.pdf>

### **More Information:**

#### Laboratory Dress Code

The student will be expected to attend class clean and neatly dressed in long pants or scrubs and wear closed-toe shoes. A laboratory coat will must be worn snapped or buttoned up during all laboratory sessions. Hair that is shoulder length or longer must be worn up or securely tied back. Gloves must be worn when handling biological materials.

#### Behavioral Conduct

While a student is representing Panola College as a Medical Laboratory Technology student, they will be expected to conduct themselves in such a manner as to reflect favorably on themselves and on the Program. If a student acts in such a manner as to reflect immature judgment or disrespect for others, the student will be called before the MLT Department Chair for determination of their status in the Program. Inappropriate conduct is grounds discipline and may be cause for immediate probation or dismissal from the Program.

#### Academic Dishonesty

Under no circumstances shall a student submit work that is not their own. Copying answers for study questions, cheating on exams and/or submitting laboratory results which are not your own are expressly prohibited.

#### Time Commitment

According to "Hints on How to Succeed in College Classes"

<http://astrosociety.org/edu/resources/success.html> you should budget your time per week for this two hour credit course as follows:

1. Reading assigned text 1 to 2 hours
2. Homework assignments 3 to 5 hours
3. Time for review and test preparation 2 hours
4. Total study time per week 6 to 9 hours PER WEEK

## SCANS CRITERIA

### 1) **Foundation skills are defined in three areas: basic skills, thinking skills, and personal qualities.**

- a) **Basic Skills:** A worker must read, write, perform arithmetic and mathematical operations, listen, and speak effectively. These skills include:
  - i) Reading: locate, understand, and interpret written information in prose and in documents such as manuals, graphs, and schedules.
  - ii) Writing: communicate thoughts, ideas, information, and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
  - iii) Arithmetic and Mathematical Operations: perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
  - iv) Listening: receive, attend to, interpret, and respond to verbal messages and other cues.
  - v) Speaking: Organize ideas and communicate orally.
- b) **Thinking Skills:** A worker must think creatively, make decisions, solve problems, visualize, know how to learn, and reason effectively. These skills include:
  - i) Creative Thinking: generate new ideas.
  - ii) Decision Making: specify goals and constraints, generate alternatives, consider risks, and evaluate and choose the best alternative.
  - iii) Problem Solving: recognize problems and devise and implement plan of action.
  - iv) Visualize ("Seeing Things in the Mind's Eye"): organize and process symbols, pictures, graphs, objects, and other information.
  - v) Knowing How to Learn: use efficient learning techniques to acquire and apply new knowledge and skills.
  - vi) Reasoning: discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.
- c) **Personal Qualities:** A worker must display responsibility, self-esteem, sociability, self-management, integrity, and honesty.
  - i) Responsibility: exert a high level of effort and persevere toward goal attainment.
  - ii) Self-Esteem: believe in one's own self-worth and maintain a positive view of oneself.
  - iii) Sociability: demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
  - iv) Self-Management: assess oneself accurately, set personal goals, monitor progress, and exhibit self-control.
  - v) Integrity and Honesty: choose ethical courses of action.

### 2) **Workplace competencies are defined in five areas: resources, interpersonal skills, information, systems, and technology.**

- a) **Resources:** A worker must identify, organize, plan, and allocate resources effectively.
  - i) Time: select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
  - ii) Money: Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
  - iii) Material and Facilities: Acquire, store, allocate, and use materials or space efficiently. Examples: construct a decision time line chart; use computer software to plan a project; prepare a budget; conduct a cost/benefits analysis; design an RFP process; write a job description; develop a staffing plan.
- b) **Interpersonal Skills:** A worker must work with others effectively.
  - i) Participate as a Member of a Team: contribute to group effort.
  - ii) Teach Others New Skills.
  - iii) Serve Clients/Customers: work to satisfy customer's expectations.

- iv) **Exercise Leadership:** communicate ideas to justify position, persuade and convince others, responsibly challenge existing procedures and policies.
- v) **Negotiate:** work toward agreements involving exchange of resources, resolve divergent interests.
- vi) **Work with Diversity:** work well with men and women from diverse backgrounds.

Examples: collaborate with a group member to solve a problem; work through a group conflict situation, train a colleague; deal with a dissatisfied customer in person; select and use appropriate leadership styles; use effective delegation techniques; conduct an individual or team negotiation; demonstrate an understanding of how people from different cultural backgrounds might behave in various situations.

c) **Information:** A worker must be able to acquire and use information.

- i) **Acquire and Evaluate Information.**
- ii) **Organize and Maintain Information.**
- iii) **Interpret and Communicate Information.**
- iv) **Use Computers to Process Information.**

Examples: research and collect data from various sources; develop a form to collect data; develop an inventory record-keeping system; produce a report using graphics; make an oral presentation using various media; use on-line computer data bases to research a report; use a computer spreadsheet to develop a budget.

d) **Systems:** A worker must understand complex interrelationships.

- i) **Understand Systems:** know how social, organizational, and technological systems work and operate effectively with them.
- ii) **Monitor and Correct Performance:** distinguish trends, predict impacts on system operations, diagnose deviations in systems' performance and correct malfunctions.
- iii) **Improve or Design Systems:** suggest modifications to existing systems and develop new or alternative systems to improve performance.

Examples: draw and interpret an organizational chart; develop a monitoring process; choose a situation needing improvement, break it down, examine it, propose an improvement, and implement it.

e) **Technology:** A worker must be able to work with a variety of technologies.

- i) **Select Technology:** choose procedures, tools or equipment including computers and related technologies.
- ii) **Apply Technologies to Task:** understand overall intent and proper procedures for setup and operation of equipment.
- iii) **Maintain and Troubleshoot Equipment:** Prevent, identify, or solve problems with equipment, including computers and other technologies.

Examples: read equipment descriptions and technical specifications to select equipment to meet needs; set up and assemble appropriate equipment from instructions; read and follow directions for troubleshooting and repairing equipment.