



COURSE Syllabus

Course number
MLT 214

CLINICAL
MICROBIOLOGY

Credits
6

Hours:
Lecture 5/Lab 3

Prerequisite: MLT
200 or Permission
of Instructor

Fall B 2017

Catalog description:

Principles and methods used in clinical microbiology including isolation, identification, and antibiotic susceptibility testing of pathogenic bacteria. Introduction to medical parasitology, mycology and virology. Laboratory component develops the technical and critical thinking skills used to evaluate clinical microbiology specimens.

Course Modifications: 08/2017

Required texts:

Title: Textbook of Diagnostic Microbiology 5th edition
Author: Connie R. Mahon, Donald C. Lehman, and George Manuselis
Publisher: Elsevier

Course/Lab Instructors:

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MCCC General Education Core Competencies and Goals

General Education Core Competencies: (GC)

A. **Communication:** Students will communicate effectively in both speech and writing.

B. **Critical Thinking and Problem-Solving:** Students will use critical thinking and problem solving skills in analyzing information.

C. **Ethical Reasoning and Action:** Students will understand ethical issues and situations.

D. **Information Literacy:** Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

E. **Computer Literacy:** Students will use computers to access, analyze or present information, solve problems, and communicate with others.

F. **Collaboration and Cooperation:** Students will develop the interpersonal skills required for effective performance in group situations.

G. **Intra-Cultural and Inter-Cultural Responsibility:** Students will demonstrate an awareness of the responsibilities of intelligent citizenship in a diverse and pluralistic society, and will demonstrate cultural, global, and environmental awareness.

General Education Goals (GG)

Goal 1. Written and Oral Communication in English: Students will communicate effectively in both speech and writing.

Goal 2. Mathematics: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Goal 3. Science: Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Goal 4. Technology or Information Literacy: Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Goal 5. Social Science: Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens. **Goal 6.** Humanities: Students will analyze works in the fields of art, music, or theater; literature; philosophy and/or religious studies; and/or will gain competence in the use of a foreign language.

Goal 7. History: Students will understand historical events and movements in World, Western, non-Western or American societies and assess their subsequent significance.

Goal 8. Diversity and Global Perspective: Students will understand the importance of a global perspective and culturally diverse peoples.

Course Competencies/Goals:

The student will be able to:

1. Demonstrate knowledge of and adhere to established guidelines for working with potential pathogens to ensure biohazard safety (GC C, D, GG 3)
2. Apply knowledge of specimen integrity. (GC C, GG 3)
3. Evaluating patient samples for potential pathogens and indigenous microflora. (GC B, GG 3)
4. Apply the principles of various staining techniques used in the microbiology laboratory to

- evaluate direct smears from specimens and culture smears (GC B, GG 3)
5. Identify the phenotypic characteristics of common pathogenic bacteria, parasites, fungi and emerging bioterrorism agents. (GG 3)
 6. Develop laboratory skill competencies used to: a) isolate & identify bacteria b) cultivate infectious agents c) perform phenotypic and genotypic diagnostic methodologies d) set up and interpret antimicrobial susceptibility testing e) issue a finalized microbiology reports and f) maintain quality control standards (GCA, B, D, GG 1, 3)
 7. Give a presentation on a common infectious agent including clinical symptoms, laboratory diagnostics and treatment of the microbe (GC A, B, D, E, GG 1, 3, 4)

Week 1: Course Introduction, Biology of Microorganisms & Microorganism Identification

Upon completion of this week, the student will be able to: Learning (cognitive) objectives:

Week 1

- 1) Define the terms used to eliminate microorganisms: sterilization, disinfection & antiseptic (GC A, GG 1, 3)
- 2) List the physical and chemical methods of hazardous waste material disposal (GG 3)
- 3) Explain the purpose of MSDS sheets (GC A, D, GG 1, 3)
- 4) List 4 different types of fire extinguishers. Explain how fire extinguishers are properly used in an Emergency (GC B)
- 5) Explain 'standard precautions' as it applies to a clinical microbiology lab setting (CG A, GG 1, 3)
- 6) List organisms found in each Biosafety level 1-4 category. Describe the 4 different classes of Biosafety hoods/cabinets (GG 3)
- 7) Explain the standard guidelines for packaging and transporting infectious materials (GC A, GG 1, 3)
- 8) Describe the lab's standard protocol for an accidental exposure to an infectious agent or hazardous material (GC A, B, GG 1, 3)
- 9) Explain proper collection methods for microbiology specimens. List some reasons for specimen rejection (GC A, B, GG 1, 3)
- 10) Explain the different purposes for different types of media (GC A, GG 1, 3)
- 11) Describe the proper atmospheric conditions needed for optimal bacterial cultivation (GC A, GG 1, 3)
- 12) Describe components of a good Quality Assurance program (TQM, CQI, PI, PT, Lean, Six Sigma). Explain how Quality Assurance helps to provide quality patient care? (GC A, B, GG 1)
- 13) Explain what a Standard Operating Procedure manual is and why it is important (GC A, D, GG 1)
- 14) Define the Infection Control terms: nosocomial infections (HAIs), multi drug resistant (MDR), Infection Control Committee, mode of transmission, sentinel event, virulence, isolation precautions, surveillance cultures (GC A, GG 1, 3)
- 15) Describe the nomenclature used to classify microorganisms (GC A, GG 1, 3)
- 16) Distinguish between the terms phenotypic and genotypic; prokaryotic and eukaryotic (GG 3)

- 17) Describe the different ways microorganisms can transfer genetic information (GC A, GG 1, 3)
- 18) Explain the different metabolic pathways that microorganisms use to form energy (GC A, GG 1, 3)
- 19) Describe the difference in the cell wall formation of gram positive and negative organisms (GC A, GG 1, 3)
- 20) Define the terms: colonization, infection, normal flora, opportunistic pathogen (GC A, GG 1, 3)
- 21) Distinguish between humoral and cell mediated immunity (GG 3)
- 22) Describe the difference between an acute, chronic and latent infection (GC A, GG 1, 3)
- 23) Define epidemiological terms (GC A, GG 1, 3)
- 24) Compare the different of microscopes used in diagnostic labs (Light, fluorescent, electron) (GG 3)
- 25) Distinguish between traditional (phenotypic) and molecular (genotypic) identification methods (GG 3, 7)
- 26) Explain common immunological and serological techniques used in infectious agent identification (GC A, GG 1, 3)

Performance (psychomotor) objectives:

- 1) Demonstrate the operation of an autoclave used for sterilizing objects and fluids (GG 2, 3)
- 2) Follow specimen collection protocols for attaining various clinical laboratory specimens. (GG 3)
- 3) Set up cultures from various body sites using different media and streaking techniques. (GG 3)
- 4) Streak agar plates qualitatively and quantitatively for isolated colonies. (GG 2, 3)
- 5) Place cultures in the appropriate atmospheric conditions for optimal growth of pathogens (GG 3)
- 6) Properly store specimens for further testing (GG 3)
- 7) Properly operate and perform maintenance on a light microscope (GG 3)
- 8) Determine and record the morphology of bacterial colonies grown on agar (GG 3)
- 9) Apply the use of proper Gram staining technique. Determine the staining characteristics of gram positive and gram negative bacteria (GC B,GG 3)

Week 2: Staphylococcus, Streptococcus & Gram Positive Rods

Upon completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) Differentiate the phenotypic characteristics of *Staphylococcus and Micrococcus spp.* (GG 3)
- 2) Explain the principles of the conventional tests used to identify *Staphylococcus spp.* : Catalase, coagulase slide & tube, StaphaurexTM (GC A, GG 1, 3)
- 3) Describe the 2 different mechanisms that result in resistant strains of Staph (GC A, B, GG 1, 3)
- 4) Explain the 'D test' and the implications of a positive test (GC A, GG 1, 3)
- 5) List the species of Streptococcus that are considered 1) Alpha hemolytic, 2) Beta hemolytic and 3) Gamma (non) hemolytic (GG 3)

- 6) Name some of the conventional biochemicals and immunological tests used to identify Strep species (GCA, GG 1, 3)
- 7) Explain the laboratory method for isolating and identifying nutritionally variant Strep (GCA, B, GG 1, 3)
- 8) Name the natural habitat and clinical significance of *Bacillus anthracis*, *B. cereus* and *B. subtilis* (GG 3)
- 9) Differential between pathogenic and nonpathogenic strains of *Corynebacterium* (GG 3)
- 10) Describe how *Listeria* infections are spread and which laboratory methods are used to identify it (GCA, GG 1, 3)
- 11) List the disease states associated with *Erysipelothrix*, *Gardnerella* and *Lactobacillus spp.* (GG 3)

Performance (psychomotor) objectives:

- 1) Fill in daily 'Preventative Maintenance' chart and record any necessary trouble shooting (GC B, D)
- 2) Perform 'parallel testing' with different lots of testing kits (GC B, GG 3)
- 3) Set up stock cultures of ATTC strains of bacteria for laboratory QC (GG 3)
- 4) Identify gram positive unknown using gram staining, biochemical and immunological techniques (GC B, GG 2, 3)

Week 3: Oxidase negative, MacConkey positive Gram Negative Rods, Oxidase positive, MacConkey positive Gram Negative Rods & Oxidase positive, MacConkey negative Gram Negative Rods

At the completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) Describe the phenotypic traits that characterize the Enterobacteriaceae family. Differentiate between pathogenic and normal fecal flora in this family (GCA, GG 1, 3)
- 2) List the selective and differential agars used in isolating gram negative rods (GC B, GG 3)
- 3) Explain the clinical significance of E.coli O157:H7 (GCA, GG 1, 3)
- 4) Define ESBL, KPC and MDR isolates (GCA, GG 1, 3)
- 5) Explain how to set up and interpret a 'Modified Hodge Test' (GCA, B, GG 1, 2, 3)
- 6) Describe the phenotypic characteristics and clinical significance of the gram negative non-fermenters: *Acinetobacter*, *Bordetella*, *Burkholderia*, *Pseudomonas*, *Stenotrophomonas*, *Ralstonia*, *Chryseomonas* and *Flavimonas* (GCA, GG 1, 3)
- 7) Outline the normal habitat and general characteristics of the following gram negative rods (*Achromobacter*, *Alcaligenes*, *Comamonas*, *Flavobacterium*, *Moraxella spp.*) (GG 3)
- 8) Describe the colonial morphology of *Vibrio spp.* and specialized media used for isolation (GCA, GG 1, 3)
- 9) Explain the clinical significance of *Aeromonas*, *Chromobacterium* and *Sphingomonas spp.* (GCA, GG 1, 3)
- 10) Identify the key phenotypic characteristics and clinical significance of *Eikenella* and *Pasturella spp.* (GG 3)

- 11) Identify the key phenotypic characteristics and clinical significance of *Actinobacillus*, *Kingella*, *Capnocytophaga* and *Cardiobacterium spp.* (GG 3)

Performance (psychomotor) objectives:

- 1) Perform conventional biochemical testing on common gram negative pathogens (GC B, GG 3)
- 2) Set up commercial biochemical tests for the identification of gram negative pathogens (GG 3)
- 3) Use biochemical profile testing to identify microorganisms (GC B,D,GG 3)
- 4) Demonstrate how an automated system is used for identification of pathogenic bacteria (GG 3)
- 5) Identify gram negative unknown using gram staining and biochemical profiling (GC B, GG 3)

Week 4: Haemophilus, Neisseria & Moraxella, Special GNRs & Antimicrobials, Obligate Anaerobes

At the completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) Detail the clinical symptoms seen in infections with *Haemophilus spp.*: *H.influenzae*, *H.parainfluenzae*, *H.ducreyi*, *H.aegyptius*, *H.hemolyticus*, *H.parahemolyticus* (GC A, GG 1, 3)
- 2) Describe the unique growth requirements needed to cultivate members of *Haemophilus spp.* (GC A, GG 1, 3)
- 3) List the clinical symptoms resulting from an infection with *Neisseria gonorrhoeae*, *N.meningitides* and *Moraxella catarrhalis* (GG 3)
- 4) Describe growth requirements for cultivating *Neisseria spp.* and *Moraxella catarrhalis* (GC A, GG 1, 3)
- 5) Explain how *Haemophilus*, *Neisseria* and *Moraxella catarrhalis* can be definitively identified in the lab (GC A, B,GG 1, 3)
- 6) Discuss the various habitat for *Bartonella spp.* (GC A, GG 1, 3)
- 7) Describe the pathogenesis, identification methods and treatment of *Helicobacter pylori* (GC A,GG 1, 3)
- 8) List the pathogenic species of *Campylobacter* and explain how it is identified in the lab. (GG 3)
- 9) Identify the causative agent of Legionnaire's disease and diagnostic methods (GG 3)
- 10) Discuss the various habitats for *Brucella spp.* and the clinical symptoms caused by infection with these organisms (GC A, GG 1, 3)
- 11) Name the causative agent of whooping cough and tularemia. Explain the lab methods used to identify these infectious agents (GC A, GG 1, 3)
- 12) List the classes of antimicrobials and their mode of action (GG 3)
- 13) Differentiate between: antimicrobial and antibiotic; synergy and antagonism; sensitive, intermediate and resistant; bactericidal and bacteriostatic (GG 3)
- 14) Explain 5 different mechanisms of antimicrobial resistance (GC A, B, GG 1, 3)
- 15) Discuss the procedures and test result interpretations for manual, automated and molecular methods used for susceptibility and resistance testing (GC A, B, GG 1, 2, 3)

- 16) Give an overview of methods used to cultivate and identify anaerobic bacteria (GC A, B, GG 1, 3)
- 17) List pathogenic anaerobes and explain their pathogenesis (GC A, GG 1, 3)

Performance (psychomotor) objectives:

- 1) Identify *Haemophilus*, *Neisseria*, *Moraxella catarrhalis* and obligate anaerobic bacteria using gram staining and biochemical profiling (GC B, D, GG 3, 4)
- 2) Set up manual susceptibility tests using Kirby Bauer diffusion disks and E tests for aerobic and anaerobic microorganisms (GG 3)
- 3) Interpret results of manual susceptibility tests (GG 2, 3)
- 4) Demonstrate how automated systems are used for the susceptibility testing of pathogenic bacteria (GG 2, 3)
- 5) Employ the proper techniques for cultivating and identifying *Campylobacter* in the laboratory. (GG 3)

Week 5: Unusual Bacteria, the Actinomycetes & Acid Fast Bacillus (Mycobacteria)

At the completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) List pathogenic bacteria that are non-culturable and their pathogenesis (GG 3)
- 2) List the 2 cell wall deficient bacteria and their pathogenesis (GG 3)
- 3) Describe the morphology, cultivation and test methods used to identify Spirochetes (GC A, GG 1, 3)
- 4) Describe the morphology, growth requirements and test methods used to identify *Actinomycetes spp.* (GC A, GG 1, 3)
- 5) Explain how Mycobacteria differ from other classes of bacteria in terms of composition, staining characteristics, cultivation and identification (GC A, GG 1, 3)
- 6) Explain when it is necessary to do susceptibility testing on *Mycobacterium spp.* (GC A, B, GG 1, 3)

Performance (psychomotor) objectives:

- 1) Determine if a patient may have syphilis by performing an RPR and observe a demonstration of an FTA confirmatory test. (GC B, GG 3)
- 2) Perform an EIA test on a patient's sample to test for a *Mycoplasma pneumonia* infection (GG 3)
- 3) Prepare smears for microscopic identification of the *Actinomycetes* and *Mycobacteria spp.* using the modified acid fast and acid fast staining techniques. Observe the staining characteristics of each class of organisms (GG 3)
- 4) Demonstrate cultivation techniques, biochemical tests and molecular assays used in the identification of the *Actinomycetes* and *Mycobacteria spp.* (GG 3)

Week 6: Blood Parasites, Protozoan Parasites & the Helminthes

At the completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) Name the different types of specimens collected for the identification of parasites (GC A, GG 1, 3)
- 2) Explain the life cycle and morphology of *Plasmodium*, *Babesia*, *Trypanosoma* and *Leishmania* spp. (GC A, GG 1, 3)
- 3) Describe the best diagnostic method for identifying the following intestinal pathogens: *Entamoeba*, *Endolimax*, *Iodamoeba*, *Blastocystis*, *Giardia*, *Chilomastix*, *Dientamoeba*, *Balantidium*, *Cryptosporidium*, *Cyclospora*, *Isospora*, *Sarcocystis*, *Enterocytozoon* and *Encephalitozoon* spp. (GC A, B, GG 1, 3)
- 4) Differentiate pathogenic microfilaria based on the presence of a sheath & tail nuclei (GG 3)
- 5) Diagram the life cycle of Schistosomes and identify the eggs of the 5 different species (GG 3)
- 6) List the parasites that can cause meningitis and encephalitis. (GG 3)
- 7) Explain specimen collection requirements are for the isolation of *Trichomonas vaginalis* (GC A, GG 1, 3)
- 8) List the populations that are at risk for infections with *Toxoplasma* spp. (GG 3)
- 9) Describe the life cycle and unique morphology of the intestinal nematodes: *Ascaris*, *Enterobius*, *Strongyloides*, *Trichuris*, *Ancylostoma* and *Necator* spp. (GC A, B, GG 1, 3)
- 10) Identify the following structures of the parasitic Cestodes: scolex, suckers, proglottid and *Rostellum* (GG 3)
- 11) Define 'hydatid cyst' (GC A, GG 1, 3)
- 12) Describe the life cycle of *Taenia solium* (pork tapeworm) (GC A, GG 1, 3)
- 13) Describe the unique morphology of the clinically significant intestinal, liver and lung Trematodes: *Fasciolopsis*, *Clonorchis*, *Fasciola*, *Paragonimus* spp. (GC A, GG 1, 3)

Performance (psychomotor) objectives:

- 1) Set up thick and thin smears for the observation and identification of blood parasites (GG 3)
- 2) Determine the morphological characteristics of blood parasites (GC B, GG 3)
- 3) Calculate the percentage of parasitemia (GG 2)
- 4) Watch a demonstration of how to prepare a trichrome smear on a stool specimen (GG 3)
- 5) Examine smears to observe the unique characteristic of protozoan parasites. Be able to use a Parasite Atlas to assist in identification features (GC D, GG 3)

Week 7: Mycology, Virology & Infections in Organ Systems

At the completion of this week, the student will be able to:

Learning (cognitive) objectives:

- 1) Define the mycology terms: saprophytic, dimorph, telomorph, hyphae, chlamydospore, mycelium, phialides, conidia, sporangia and dematiaceous (GC A, GG 1, 3)

- 2) Differentiate between superficial, cutaneous, subcutaneous and systemic mycosis. Give an example of each (GG 3)
- 3) List the media used in the cultivation of molds and yeast (GG 3)
- 4) List the common dermatophytes and describe their pathogenesis (GG 3)
- 5) Describe common antifungal agents and their mode of action (GCA, GG 1, 3)
- 6) Explain how molds and yeast are identified (GCA, B, GG 1, 3)
- 7) Describe the recent taxonomic changes made for *Pneumocystis jiroveci* (GCA, GG 1, 3)
- 8) Describe the structure of a 'virion' (GCA, GG 1, 3)
- 9) Explain the steps of viral pathogenesis (GCA, B, GG 1, 3)
- 10) Give an overview of specimen collection for viral cultures (GCA, B, GG 1, 3)
- 11) Outline the traditional and modern ways of identifying viruses: cell culture, shell vial, hemadsorption, Tzanck smear, immunological, serological and molecular methods (GC B, GG 3)
- 12) List the viral families and give an example of a virus found in each (GG 3)
- 13) Explain how viral susceptibility testing differs from bacterial (GCA, B, GG 1, 3)
- 14) Name the commonly used antiviral agents (GCA, GG 1, 3)
- 15) Give examples of pathogens seen in the following organ infections: blood, upper and lower respiratory, oral cavity, CNS, eyes, ears, sinuses, urinary and genital tract, gastrointestinal tract, wound infections, sterile body fluids and bone (GCA, B, GG 1, 3, 5)

Performance (psychomotor) objectives:

- 1) Examine trichrome smears to identify the unique features of helminth eggs and worms Be able to use a Parasite Atlas to assist in identification features. (GC B, D, GG 3)
- 2) Perform staining techniques used in the identification of molds and yeast. Be able to use a Mycology Atlas to assist in identification features (GC D, GG 3)
- 3) Set up a biochemical test for the identification of yeast. Interpret the test results using an online compendium (GC B, D, E, GG 3)
- 4) Demonstrate how to set up a cell culture and shell vial for virus isolation and identification (GC B, GG 3)
- 5) Determine the CPE (cytopathic effect) seen in cell cultures. Observe fluorescent staining of viral inclusions from a shell vial (GC B, GG 3)

PERFORMANCE EXIT LEVEL SKILLS

1. Demonstrate safety and quality control practices in clinical microbiology (GC C, GG 3)
2. Operate an autoclave used for the sterilization of objects and fluids. (GG 3)
3. Collect microbiology specimens and set up cultured from various body sites (GC B, GG 3)
4. Properly operate and perform maintenance on a light microscope (GG 3)
5. Determine the morphology of bacterial colonies and staining characteristics of gram positive and gram negative bacteria (GC B, GG 3)
6. Complete daily 'Preventative Maintenance' chart and record all corrective action (GC B, GG 2, 3)
7. Perform 'parallel testing' on diagnostic test kits (GC B, GG 3)
8. Set up stock cultures of ATCC strains of bacteria for laboratory QC (GG 3)

9. Identify gram positive and gram negative unknowns using gram staining, conventional, commercial and automated biochemical profiling and immunological techniques (GC B, D, GG 3)
10. Cultivate and identify obligate anaerobic bacteria (GC B, GG 3)
11. Set up and interpret manual susceptibility tests (GC B, GG 3)
12. Demonstrate how automated systems are used for susceptibility testing (GC B, GG 3)
13. Use a serological test to diagnose an infectious disease; interpret the test results (GC B, GG 2, 3)
14. Perform staining techniques, cultivation and diagnostics tests used for identifying *Actinomycetes* and *Mycobacteria spp.* (GG 3)
15. Set up thick and thin smears for the observation blood parasites. Identify blood parasites based on their unique morphological characteristics (GC B, GG 3)
16. Prepare a trichrome smear on a stool specimen. Describe the unique characteristics of protozoan and helminth parasites (GC B, GG 3)
17. Perform staining techniques used in the identification of molds and yeast (GG 3)
18. Identify common fungal pathogens based on their unique phenotypic characteristics (GC B, GG 3)
19. Set up a cell culture and shell vial for the isolation and identification of viruses (GG 3)
20. Identify viral CPE (cytopathic effects) seen in cell cultures and shell vials (GC B, GG 3)

Laboratory Competency Skills

Students will be assessed in the laboratory for competence in technical skills, understanding procedures and display of professional attributes. Timed laboratory practical exams measure the student's mastery of entry level, basic laboratory techniques. Laboratory Competency in the affective domain will be evaluated on the student's ability to 1) follow instructions and safety protocol, 2) display professionalism and 3) use good communication skills.

Affective Objectives

Affective objectives are behavioral standards that will be implemented during the professional phase of the Medical Laboratory Technology Program. Students will be evaluated by faculty using these standards throughout the course. Unsatisfactory performance in any area of the behavioral standards will require a consultation with the faculty and/or the MLT Program coordinator. The reason for the consultation will be clearly stated, counsel will be given and an action plan will be implemented. The student will be given the opportunity to give a written response. The consultation form will be kept in the student's file.

Affective Scoring based on Professional Performance

Affective objectives are behavioral standards that will be implemented during the professional phase of the Medical Laboratory Technology Program. Students will be evaluated by faculty using these standards throughout the course. The student is evaluated on the demonstration of performance that reflects achievement of important objectives for medical laboratory technicians. This professional performance will be evaluated during the laboratory course and will be returned to the student with their all laboratory worksheets submitted. See the last page for a detailed list of the criteria.

PROFESSIONAL PERFORMANCE EVALUATION

1. DEPENDABILITY

The student arrives in the laboratory with adequate time to start lab session as scheduled. The student comes with appropriate manual and supplies, and wearing required laboratory attire. The student shows evidence of having reviewed the assigned topic before coming to the laboratory. The student completes assignments (lab reports, homework assignments, etc) on time.

2. ATTENTIVENESS

The student is attentive to the instructor, takes complete notes and proceeds with laboratory work without repeated instructions. The student follows verbal and written instructions, asks pertinent questions when necessary, and seeks the instructor's assistance when needed. The student neither distracts others nor allows distractions to affect completion of laboratory exercises.

3. ORGANIZATION

The student demonstrates the ability to organize work to be done within the available laboratory time. The student is able to perform multiple tasks without jeopardizing accuracy and precision.

4. INDEPENDENCE

The student demonstrates the ability to work independently by exercising independent judgement and thinking logically in using the protocols and instructions given. The student draws on previously gained information to solve problems without prompting from instructor. The student seeks activities to expand knowledge, ability and performance.

5. RECORD KEEPING

The student demonstrates the importance of proper record keeping by accurately and legibly labeling/recording laboratory work and reports (i.e. sample containers, reagents and worksheets).

6. MANAGEMENT AND ECONOMY

The student conserves reagents and supplies. The student maintains an adequate supply of common use items at their appropriate workstation. The student takes proper care of equipment.

7. SAFETY

The student works in an orderly and safe manner, enabling others to safely work in the same general area. The student adheres to the guidelines of the Laboratory Safety Regulations (e.g. wearing eye protection, keeping long hair tied back, and properly storing hazardous materials).

8. INTERPERSONAL SKILLS

The student communicates in a professional, positive, tactful manner with peers and instructors. The student consistently shows common courtesy (e.e. restocks supplies) and contributes towards achieving an environment conducive to work and learning for self and others.

9. COMPOSURE

The student maintains composure and work quality under stressful conditions and adapts quickly to new situations. The student recognizes his/her own personal strengths and weaknesses and works positively within that framework. The student accepts evaluation of performance as constructive when offered by instructors and follows through with suggestions made.

10. INTEGRITY

The student accepts accountability for work performed. The student readily admits errors, follows procedures (including quality control) as written, and maintains confidentiality of patient results, if applicable. Student exhibits perseverance to obtain accurate results.

Scoring: Total number of possible points= # of weeks x # of categories X 4 (Greatest achievable score) =n Achieved points = student scores: Total of numbers each week (#4s + #3s+ #2s+#1s)

Cut off values: Upper cut-off value=0.675n; lower cut-off value= 0.425n

How your Final Grade can be Affected

If $a > 0.675n$, then the course grade is increased one step (e.g., from C to C+)

If a is between $0.425n$ and $0.675n$, then the course grade is unaffected (e.g. C remains C)

If $a < 0.425(n)$, then the course grade is decreased one step (e.g. C to C-).

If course grade remains within range: student will receive full credit for affective score

Progression in the MLT Professional Courses

As noted in the course handbook, a final grade of a C+ or better in each Medical Laboratory Technology course is necessary to progress to the next professional phase course.

Unsatisfactory Performance

Unsatisfactory performance in any area (cognitive, psychomotor or affective), failure to follow directions or procedures, unsafe or unethical behavior, or failure to keep a grade of 77 or above in the course will require a consultation with the faculty and/or the MLT Program coordinator. The reason for the consultation will be clearly stated, counsel will be given and an action plan will be implemented. The student will be given the opportunity to give a written response. The consultation form will be kept in the student's file and progress must be made by following the plan of action.

Grading Policy:

To receive a passing grade, students must earn a 77 or higher. A final grade of 77 or higher is required in each Medical Laboratory Technology course in order to progress to the next MLT course and to graduate. No make-up exams are to be given unless there are extenuating circumstances.

A	93-100%	B-	80-82
A-	90-92	C+	77-79
B+	87-89	C	70-76
B	83-86	D	60-69
		F	0-59%

Lecture

Quizzes	10%
Assignments	10%
Presentation	10%
Midterm	15%
Final	<u>15%</u>
	60%

Laboratory

Reports	10%
Midterm	15%
Final	<u>15%</u>
	40%

Opportunities for Extra credit:

These are optional assignments worth 5 points. **You have up to three opportunities for a total of 15 points.**

To earn all 5 points students will find a recent scientific journal or news article (with proper citations to scientific journals) about microbiology. The assignment must be a 1-2 page summary of the chosen article typed in 12pt font and double spaced. Students must also provide the source for full credit. Students may only turn in one summary at a time, and no more than three for the duration of the course.

Attendance Policy: Absences and Tardiness

While I do not directly count attendance in the overall grade, it will be factored into your weekly professional behavior assessment. As such, **I expect to be notified ahead of time** in the case that you cannot attend lecture or laboratory.

Cellular Telephones, Personal Telephone Calls, and Electronic Devices

Students are **NOT** to receive or place telephone calls or text messages during class, labs, or clinical hours. Cellular telephones and other electronic devices are to be **silenced and put away before entering and during the duration** of class, lab, or the clinical site. Inappropriate use of any electronic device may result in disciplinary action.

Late work:

I expect assignments to be turned in at the start of class. **I do not accept late assignments. Late work will receive no points.** If you are sick on the day an assignment is due, you can e-mail me the assignment before lecture time. If this is an extended absence, you should phone or email me as soon as possible to discuss your return and submission of work with documentation. I encourage you to email me or make an appointment if you are having any problems.

Academic Integrity Policy:

Any student who (1) knowingly represents the work of others as his/her own, (2) uses or obtains unauthorized assistance in the execution of any academic work or (3) gives fraudulent assistance to another, is guilty of cheating. Violators will be penalized in accordance with established college policies and procedures.

Support Services for Differing Abilities

Mercer County Community College is in compliance with both the ADA and section 504 of the Rehabilitation Act. If you have, or believe you have, a differing ability that is protected under the law please contact Arlene Stinson in LB 216, 609 570-3525, stinsona@mccc.edu for information regarding support services.

If you do not have a documented differing ability, other support services are available to all students on campus including the Learning Center located in LB 214

Note: Students must seek out help from this department and alert the instructor of the accommodation(s) prior to the start of the course. We CANNOT make the accommodations AFTER the course has started.

MLT 214: Clinical Microbiology
Schedule is subject to change as deemed necessary.

Date	Lab	Lecture
Oct 24	Safety, QC, streaking and media	Chapter 1, 2, 6
Oct 25	Gram staining and colony morphology Handwashing vs. hand sanitizer lab	Chapters 4, 7, 8
Oct 26	Finish Handwashing vs. hand sanitizer lab	Chapter 3, 14
Oct 31	Staphylococci Antimicrobial susceptibility	Chapters 12, 13, 15 Quiz/Assignment Due
Nov 1	Finish Antimicrobial susceptibility and staphylococci Throat culture	Chapters 5, 10, 11
Nov 2	Streptococci Rapid Strep test	Chapters 16, 17, 38 Lab Report Due
Nov 7	GPC, GPB Unknowns	Chapter 11, 18 Quiz
Nov 8	Finish unknowns GPR and GNR	Chapter 9, 19
Nov 9	Finish unknowns Finish GPR and GNB	Chapter 20 Assignment due
Nov 14	Midterm	Midterm
Nov 15	Enterobacteriaceae	Chapter 21, 22
Nov 16	Finish Enterobacteriaceae Anaerobes	Chapter 23, 24, 25 Lab report due
Nov 21	Finish Anaerobes Unknowns GNB	Chapter 26
Nov 22	Finish unknowns Parasite slides	Chapter 27 Assignment due
Nov 28	Urine cultures	Chapter 28 Quiz
Nov 29	Finish Urine cultures Blood cultures	Chapters 29, 30
Nov 30	Rapid tests	Chapters 40, 41
Dec 5	Final Unknowns	Chapters 32, 33, 34 Assignment due
Dec 6	Continue Unknowns	Chapters 35, 36, 37
Dec 7	Finish Unknowns	Chapters 38, 39
Dec 12	No lab	Unknown Presentations
Dec 13	Final	Final (Cumulative with emphasis on new material)