



This course provides entry-level clinical laboratory experience in the area of Microbiology. Emphasis is placed on technique, accuracy, and precision. Upon completion, students should be able to demonstrate entry-level competence on final clinical evaluations.

### **III. Statement of Course Need**

- A. Microbiology testing and analysis are necessary skills needed for competent MLTs. This course is required for the Medical Laboratory Technology program.
- B. This course is completed at the clinical site.
- C. This course generally transfers as a Free Elective, but it may transfer as a Program Elective to schools that offer a B.S. degree in Clinical Laboratory Science.

### **IV. Place of Course in College Curriculum**

- A. Free Elective
- B. This course meets a program requirement for the Associate of Applied Science degree program in Medical Laboratory Technology
- C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org); b) for all other colleges and universities, go to the individual websites.

### **V. Outline of Course Content**

1. Recording and reporting of laboratory results with accuracy.
2. Quality control procedures, results interpretation and recognizing critical values
3. Specimen acceptability criteria
  - a. collection, storage, handling, and labeling of specimens
  - b. examine for evidence of contamination
  - c. identify appropriate transport conditions
4. Safety precautions and methods when handling biological hazards.
  - a. Utilize biologic safety hood when working with airborne pathogens
  - b. Wear appropriate safety clothing such as mask, gloves, and lab coat
  - c. Disinfect work area before and after use
  - d. Wash hands prior to leaving work area
  - e. Clean spills with appropriate disinfectants
  - f. Dispose of biohazardous materials in accordance with lab procedure manual
5. Specimen collection methods:
  - a. Urine cultures
  - b. Anaerobic cultures
  - c. Sputum cultures
  - d. Throat cultures

6. Transport media and method of inoculation
7. Choice of media and inoculation method
8. Inoculation method
  - a. Demonstrate proper streak technique, obtain isolated colonies
  - b. Correctly label all materials
  - c. Use appropriate calibrated loops for urines and correctly calculate colony count
9. Incubation
10. Media composition
  - a. Blood agar
  - b. EMB agar
  - c. MacConkey agar
  - d. Hektoen Enteric agar
  - e. Thayer Martin or GC lect agar
  - f. XLD agar
  - g. SS agar
11. Colony morphology of common microorganisms on the media listed in # 10.
12. Slide preparation, staining and interpretation
13. Gram stain reaction.
14. Biochemical or confirmatory test(s) for identification of pathogenic isolates
15. Interpretation of rapid tests or automated systems for organism identification
16. Pure isolate from mixed culture
17. Detection of bacterial antigens in specimens.
18. Acceptable QC criteria for antimicrobial susceptibility testing and interpretation
19. Anaerobic environmental conditions
20. Aseptic techniques in blood cultures
21. Identification of positive blood cultures
22. Classification of Micrococci,
  - a. General requirements for oxygen, gram stain and growth requirements
  - b. Characteristics used to differentiate staphylococci and micrococci
23. General characteristics of Streptococci including:
  - a. appearance on blood agar
  - a. CO<sub>2</sub> requirements
  - b. Growth requirements
  - c. Gram stain
24. Serological typing for Streptococci
25. General characteristics of Neisseria and Moraxella
26. Identification of Haemophilus species according to infection site, hemolysis on BAP, and X and V requirements.
27. Enterobacteriaceae
28. Principle and performance of the following biochemical tests:
  - a. TSI
  - b. Citrate
  - c. Nitrate reduction
  - d. Decarboxylase
  - e. ONPG

- f. Indole
  - g. Urea
  - h. Methyl Red
  - i. Voges Proskauer
  - j. Motility media
29. Interpretation of biochemical tests listed in #28 as positive or negative and identify the most likely organism given the results.
  30. Campylobacter species and their subspecies.
  31. Clinically significant organisms in blood cultures.
  32. Organisms requiring special procedures for isolation from blood cultures.
  33. General characteristics of the non-fermenters.
  34. Bordetella species with their associated diseases and appropriate culture media.
  35. Brucellosis, identification and serologic findings.
  36. Colonial morphology of *Corynebacterium diphtheriae*
  37. Characteristics of *Listeria monocytogenes*, including:
    - a. Motility pattern
    - b. Enrichment techniques
    - c. Disease association
    - d. Special media
    - e. Colonial morphology
  38. Types of infections and specimens likely to yield anaerobes.
  39. Procedure and results of Ziehl-Neelsen and Kinyoun acid fast stains
  40. Special media used in cultures of mycobacteria
  41. Photo-reactivity for clinically important mycobacteria
  42. Key biochemical tests used to identify mycobacteria.
  43. Direct microscopic examination of mycology specimens to include:
    - a. skin, nails, and hair
    - b. sputum
    - c. blood and body fluids
    - d. urine
    - e. stool
    - f. tissue
    - g. bone marrow
    - h. vaginal secretions
  44. Identification procedures for microorganisms:
    - a. KOH prep
    - b. India ink
    - c. Saline prep
  45. Special media used in cultures of fungi and yeasts.
  46. Procedures for examination of fungal cultures.
  47. Dermatophytes and the specific body area affected
    - a. Microsporum
      - a. Trichophyton
      - b. Epidermophyton
  48. Microscopic appearance of organisms associated with mycoses
  49. Acceptability of parasitology specimens with regard to:

- a. Time of collection
  - b. Storage
  - c. Number of specimens
  - d. Volume
  - e. Preservative
50. Preparation and examination of fresh stool specimens for identification of fungi, ova, and parasites.
  51. Concentration and staining techniques for identification of protozoa, ova, and parasite.
  52. Microscopic examination of *Trichomonas vaginalis*

## **VI. General Education and Course Learning Outcomes**

### **A. General Education Learning Outcomes:**

**At the completion of the course, students will be able to:**

1. Explain the principles and significance of clinical microbiology tests and results (NJ GE-1).
2. Use appropriate mathematical applications to interpret data (NJ GE-2\*).
3. Explain the principles of and demonstrate correct use of clinical microbiology instrumentation and technology (NJ GE-1, 3, 4).

(\*Embedded critical thinking)

### **B. Course Learning Outcomes:**

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

1. Perform the appropriate manual and automated analyses in microbiology lab with accuracy and precision.
2. Evaluate and apply quality control measurements in all phases of analysis in the microbiology lab.
3. Handle specimens for assay procedures following standard precautions and safety.
4. Identify the abnormal patient results and correlate those results with the patient's condition, and accurately report them.

### **C. Assessment Instruments**

Students in this course are evaluated by the following methods.

- 1- Observation by clinical site instructors
- 2- Weekly Journal

3- Presentation

## **VII. Grade Determinants**

1- Observation by Clinical Instructors

2- Weekly Journal

Students are expected to maintain a weekly journal and are graded based on completion.

3- Presentation

Students are graded based on the rubric provided to them.

## **VIII. Texts and Materials**

Students must maintain the weekly lab journal during their clinical rotation.

Textbook of Diagnostic Microbiology, 6th ed. Connie Mahon  
ISBN13: 9780323613170  
ISBN10: 0323613179

The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

## **IX. Resources**

A. Clinical site laboratory

B. RVCC library database

## **X. Honors Options**

An Honors Option is not available for this course.