

El Paso Community College

Syllabus

Part II

Official Course Description

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| SUBJECT AREA | <u>Medical Laboratory Technology</u> |
| COURSE RUBRIC AND NUMBER | <u>MLAB 1235</u> |
| COURSE TITLE | <u>Immunology/Serology</u> |
| COURSE CREDIT HOURS | <u>2 1 :<!-- 3</b--></u> Credits Lec Lab |

I. 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 lab safety. A grade of "C" or better is required in this course to take the next course. **Corequisite: MLAB 1260. (1:3). Lab fee.**

II. Course Objectives

- A. Unit I. Laboratory Operations
Upon satisfactory completion of this unit, the student will be able to:
1. Demonstrate adherence to Standard Precautions and the organizations' SOP (Standard Operating Procedures) at all times.
 2. Discuss legal and ethical concerns pertaining to Patient Informed Consent, Standard of Care, and HIPAA regulations.
 3. Compliance with government, state, and organizational safety regulations involving Biological, Chemical, Radioactive, Fire, Physical, and Electrical hazards.
 4. Explain the importance of actively participating in Quality Assurance, Quality Control and Proficiency Testing protocols incorporating precision, accuracy, Levi Jennings Charts and Westgard Rules.
 5. Locate and make use of MSDS (Material Safety Data Sheets)
 6. Discuss how OSHA affects safety, health, and compliance policies in the workplace.
 7. Discuss nosocomial infections and identify the basic programs for infection control.
 8. Identify the potential routes of infection and methods for preventing transmission of microorganisms through these routes.
 9. Explain the proper techniques for hand washing, gowning, gloving, and masking.
 10. Compare and contrast the different blood collection biohazard containers used to dispose of contaminated materials.
 11. Demonstrate pipetting techniques and serial dilutions.
- B. Unit II. The Human Immune System
Upon satisfactory completion of this unit, the student will be able to:
1. Discuss functions of the immune system, and compare and Contrast "innate" vs. "acquired" immunity with regard to specificity and mode of action.
 2. List and explain four (4) examples of innate immunity.
 3. Define and cite an example of:
 - a. Naturally acquired active immunity
 - b. Artificially acquired active immunity
 - c. Naturally acquired passive immunity
 - d. Artificially acquired passive immunity

4. Define cell-mediated and humoral immunity.
5. Contrast "B cells" and "T cells" with regard to site of production, life-span percentage peripheral blood, and type of immunity.
6. Define "complement", list three (3) of its functions, and briefly summarize the activation sequence.
7. Identify primary and secondary lymphoid tissue and explain function(s).

C. Unit III. Antibodies and Antigens

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

1. Define "antigen" and list its characteristics with respect to molecular weight, chemical structure, size, and foreign nature.
2. Define "carrier", "determinant", and "haptens".
3. Define "antibody" and list its characteristics with respect to specificity and chemical nature.
4. Sketch an immunoglobulin molecule and label the light and heavy chains, the constant and variable regions, the F_{AB} and F_C portions, and the antigen binding sites.
5. List the five (5) classes of immunoglobulin's, describe their main function and structure, and state whether they fix, complement, and/or cross the placenta.
6. Identify specific characteristics of each immunoglobulin such as which immunoglobulin class is the most abundant in serum, which class is produced first in response to primary stimulus, which is present in secretions, etc.
7. List at least three (3) functions of antibodies.
8. Compare and contrast primary and secondary antibody responses with respect to intensity, duration, and immunoglobulin class.
9. Define and explain the following terms: avidity, affinity, specificity, cross reactivity and immune complex

D. Unit VI. Immunology/Serology Procedures

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

1. Define "precipitation reaction" in terms of the "lattice hypothesis".
2. Describe the method and describe the most common procedures used in immunology/serology:
 - a. Double diffusion
 - b. Radial diffusion
 - c. Immunoelectrophoresis
 - d. Nephelometry
 - e. Flow Cytometry
 - f. RAST and RAT
 - g. EIA
 - h. Immunofixation
 - i. Western Blot
 - j. PCR
3. Define "agglutination reaction" and contrast this from precipitation in terms of the antigen involved.
 4. List three (3) types of "particles" used in agglutination reactions and describe what type of test they may be used in.
5. Define and sketch "prozone", "postzone", and equivalent zone reaction and discuss the effect these reactions have on Serotesting.
6. Define "titer".
7. Define "cross-reactivity" and discuss how this phenomenon may be useful.
8. In Serology and how it may be responsible for "false positives".
9. Explain hemagglutination.
10. Explain the complement fixation test in terms of the two-step method and discuss the interpretation of results.
11. Describe the principle of fluorescent antibody techniques, including direct, indirect, and inhibitor methods.
11. Briefly discuss the principle of Radioimmunoassay (RIA) and give an example.

E. Unit V. Laboratory Testing

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

1. List two (2) serious complications which are a result of untreated Streptococcus infections.
2. Describe why Serotesting becomes important if one of these diseases is suspected.

3. List the two (2) exotoxins produced by pathogenic strains of Streptococcus.
4. Describe the latex agglutination test and explain why it is the best Screening test.
5. Explain the principle behind the Anti-Streptolysin O test and methods of reporting results.
6. Discuss the expected results in the ASO control tubes and discuss possible reasons for unexpected results.
7. Classify Streptococcus organism by hemolysis pattern and serotyping
8. Compare and contrast Streptococcus Group A and Group B.

F. Unit VI. Immunologic Diseases, Infections, and Disorders

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

1. Name the causative organism in Syphilis and state two (2) methods of transmission.
2. Name the causative organism for Infectious Mononucleosis, identify the Viral family, discuss the symptoms and possible complications of the disease.
3. Define "heterophile antibody
4. Discuss cytomegalovirus as an etiologic agent and clinical significance
5. List the viruses responsible for hepatitis and contrast them with respect to incubation period and mode of infection.
6. Classify hepatitis infections with regard to symptoms and causative organisms.
7. List the two (2) common names for Rubella.
8. Identify the etiologic agent and the viral family.
9. Explain cases when Rubella is a significant disease and the possible consequences of congenital Rubella.
10. Discuss the principle of the Hemagglutination test for Rubella and the significance of titers obtained.
11. List three (3) laboratory tests used in the diagnosis of SLE and evaluate the theory behind each including ANA testing, titers and reaction patterns.
12. Briefly describe the disease Rheumatoid Arthritis with respect to symptoms, and sex most commonly affected.
13. Explain what the rheumatoid factor is, including the classes of Immunoglobulins involved.
14. Explain the principle behind serologic testing for Rheumatoid Arthritis and list at least two (2) examples of false positives with these tests.
15. Explain immunoassay testing.

III. THECB Learning Outcomes (WECM)

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.

IV. Evaluation

A. Preassessment

Students should have successfully completed the Specialized Admissions process to enter the Medical Laboratory Technology Program. Prerequisites and/or Corequisites may be required for MLAB courses.

B. Postassessment

1. Quizzes, lecture exams, and a final comprehensive written examination will be used to assess students' competency in didactic objectives.
2. Lab competency exams and lab practical exams are used to assess students' achievement of psychomotor objectives.
3. Lab practical exams require students to demonstrate a particular skill learned in the lab component of the class.
4. Written unit exams will consist of the following question types: multiple-choice, completion, essay, matching, spelling, analysis, and definition or any combination of these.

C. Final Examination

A comprehensive final exam will be administered at the end of the course.

D. Evaluation

To evaluate students' achievement of course objectives, student grades are tabulated using a final grade break down sheet. To successfully complete MLAB1235 Immunology/Serology to CLS, the student must achieve at least a 70% in course components. The students overall grade must be no less than "C". (Note: All health programs require a grade of no less than "C," therefore no "D's" will be awarded for this course)

E. Remediation

If a student scores less than 70% on any exam, the instructor will encourage the student to conference with the instructor or tutor, to review problem areas. Different learning and studying techniques will be discussed.

F. Grading

Grading Scale used in calculating students' final grade for MLAB 1235 Immunology/Serology.

| <u>Evaluation Tools</u> | <u>% Value</u> | <u>Grading Scale</u> |
|-------------------------|----------------|----------------------|
| Quizzes | 10% | A = 90 - 100% |
| Lecture Exams I | 20% | B = 80 - 89% |
| Lecture Exam II | 20% | C = 70 - 79% |
| Lecture Exam III | 20% | D = 60 - 69% |
| Comprehensive Final | 30% | F = 59 and below |

(Immunology lab is on a Pass/Fail bases. Laboratories will be graded on a Pass/Fail system based on the competency limits set by the program for each individual procedure. An average of 80% is required to pass the laboratory portion of MLAB 1235 Immunology/Serology.)

Each grade will initially be determined in decimals to the tenths. The final grade however, will only be recorded as a whole number. The guide used will be to round 0.1 through 0.4 to the lower whole number, and 0.5 through 0.9 are raised to next whole number. Example: If at the end of the course a student earns 87.4; the grade will be reflected as 87%. If the student earns 87.6 the grade is rounded to 88%. No decimals will be shown on the final grade scanners.

V. Disability Statement (Americans with/Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.

VII. Title IX and Sex Discrimination

Title 9 (20 U.S.C. 1681 & 34 C.F.R. Part 106) states the following "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to

discrimination under any educational program or activity receiving Federal financial assistance." The Violence Against Women Act (VAWA) prohibits stalking, date violence, sexual violence, and domestic violence for all students, employees and visitors (male and female). If you have any concerns related to discrimination, harassment, or assault (of any type) you can contact the Assistant to the Vice President for Student and Enrollment Services at 915-831-2655. Employees can call the Manager of Employee Relations at 915-831-6458. Reports of sexual assault/violence may also be reported to EPCC Police at 915-831-2200.