

# El Paso Community College

## Syllabus

### Part II

## Official Course Description

<b>SUBJECT AREA</b>	<b>Medical Laboratory Technology</b>								
<b>COURSE RUBRIC AND NUMBER</b>	<b>MLAB 2361</b>								
<b>COURSE TITLE</b>	<b>Clinical – Clinical/Medical Laboratory Technician V</b>								
<b>COURSE HOURS</b>	<table border="0" style="margin: auto;"> <tr> <td style="text-align: center;"><b>3</b></td> <td style="text-align: center;"><b>0</b></td> <td style="text-align: center;"><b>:</b></td> <td style="text-align: center;"><b>15</b></td> </tr> <tr> <td style="text-align: center;"><b>Credits</b></td> <td style="text-align: center;"><b>Lec</b></td> <td></td> <td style="text-align: center;"><b>Lab</b></td> </tr> </table>	<b>3</b>	<b>0</b>	<b>:</b>	<b>15</b>	<b>Credits</b>	<b>Lec</b>		<b>Lab</b>
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<b>Credits</b>	<b>Lec</b>		<b>Lab</b>						

### I. Catalog Description

Provides a health-related work-based learning experience that enables the student to apply specialized occupational theory, skills and concepts. Direct supervision is provided by the clinical professional. Includes clinical practice in the areas of Clinical Chemistry, Microbiology, Urinalysis, Hematology, Serology, Immunohematology, Coagulation, and Phlebotomy. A grade of "C" or better is required in this course to take the next course. **Prerequisites: MLAB 2360 and MLAB 2434. Corequisites: MLAB 1231 and MLAB 2238. (0:15). Professional Practice Insurance required.**

### II. Course Objectives

- A. Unit I. Laboratory Operations and Safety  
Upon satisfactory completion of this unit, the student will be able to:
1. Adhere to HIPAA protocols when communicating via computer, telephone, facsimile, E-mail, performing Delta Checks, order entry, releasing patient results, or cancelling requisitions.
  2. Demonstrate adherence to Standard Precautions and the organizations' SOP (Standard Operating Procedures).
  3. Compliance with government, state, and organizational safety regulations involving Biological, Chemical, Radioactive, Fire, Physical, Electrical hazards.
  4. Adhere to "STAT" protocols in relation to turnout time for sample collection, test performance, and test reporting.
  5. Participate in Quality Assurance, Quality Control and Proficiency Testing protocols incorporating precision, accuracy, Levi Jennings Charts and Westgard Rules.
  6. Locate and make use of MSDS (Material Safety Data Sheets).
  7. Adhere to hospital emergency codes, use PPE, decontaminate a working area as needed, and dispose of biohazard contaminated material in biohazard or sharp containers.
- B. Unit II Chemistry  
Upon satisfactory completion of this unit, the student will be able to:
1. Operate chemical analyzers utilized in the rotation to include loading of machine, troubleshooting, maintenance, test requisitioning, reporting of results and adherence to HIPAA guidelines to safeguard patient data, security and access control.
  2. Perform and explain the manual or automated methods used for the determination of:
    - a) Enzymes
    - b) Electrolytes
    - c) Trace elements
    - d) Thyroid hormones
    - e) Therapeutic drug monitoring
    - f) Drugs of abuse.

- g) Different Body Fluids
- 3. Perform chemical testing, interpret test results and explain the principal methods used to:
  - a) Confirm infectious diseases
  - b) Make use of tumor markers
  - c) Read electrophoresis patterns
  - d) Detect Fetal abnormalities
- 4. Explain the clinical significance and the clinical determination of “Reference Ranges” for infants, children, adult and geriatric patients.

C. Unit III. Microbiology

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

1. Process microbiology samples submitted to the department for in-house testing or as send-outs.
2. Identify the type of organisms that may be cultured from Amniotic, Cerebral, Pleural, Peritoneal, Vaginal, Seminal, and Synovial Fluid.
3. Master the skill of selecting the appropriate media for growth, streaking plates to obtain isolated colonies, incubation requirements, culturing the organism for slide making and performing Gram staining techniques.
4. Identify, through biochemical, morphologic, and gram stain characteristics, anaerobic gram positive and negative cocci and anaerobic gram positive and negative bacilli.
5. Perform and interpret sensitivity testing.
6. Perform and evaluate ova and parasite concentrations and trichrome stains using the differentiating characteristics for these parasites.
7. When appropriate, apply mycology and mycobacteriology identifying techniques to isolate, and identify this type of microorganism.
8. Perform and interpret Rapid Screening tests.
9. Perform basic virology testing.

D. Unit IV. Hematology

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

1. Interpret results for a CBC, Indices, Differential, Scattergram, Histogram, and Flow Cytometry.
2. Explain the use of laboratory requisition forms, CPT and ICD codes, patient ABN notification and basal state requirements.
3. Identify the blood collection evacuation tubes required for the Hematology department to include the type of additive, amount to be drawn, the reasons such an additive is used, and the importance of the order of draw.
4. Correlate the significance of quality lab results based on quality collection, transportation, processing, and storing of patient samples.
5. Master the use of a clinical microscope including the handling, cleaning, illumination calibration, adjusting, changing out fuses and light bulbs.
6. List the parts of a microscope and explain their function.
7. Describe the four components of blood, and explain the clinical significance of studying the RBC's, WBC's and Platelets using manual techniques, automated cell counters, and/or flow cytometry procedures in a hematology department.
8. Explain the use of Wright Stain used to stain the cellular components of blood and bone marrow using Methylene Blue and Eosin to include other supravital stains used in the Hematology Department.
9. Perform differentials, including both abnormal and normal evaluations, reticulocyte counts, and coagulation and serologic studies.

E. Unit V Coagulation and Hemostasis

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

1. Present the basic theoretical concepts of hemostasis.
2. Explain the importance of accurate patient blood collection sampling for coagulation studies to include:
  - a) Tourniquet placement and duration

- b) Specific evacuated blood collection tube and its additive
  - c) 9:1 ratio
  - d) Tissue thromboplastin contamination
  - e) Use of Winged Infusion Sets
  - f) Tube fill rate
  - g) Medication dosage based on lab results
  - h) Explain the role of tissue thromboplastin in activating coagulation.
  - i) Describe hemolysis and explain its effect if photometric testing is performed.
3. Perform and explain the significance and/or role of the following coagulation tests:
- a) Bleeding time
  - b) Clot Retraction
  - c) Platelet Aggregation
  - d) Prothrombin time (PT)
  - e) PT-INR (Prothrombin Time- International Normalized Ratio)
  - f) Activated Partial Thromboplastin Time (APTT)
  - g) Activated Coagulation Time
  - h) Thrombin Clotting Time (Thrombin Clotting Time (TCT)
  - i) Fibrinogen
  - j) D-Dimer
  - k) Mixing studies
  - l) Low Molecular Weight heparin

F. Unit VI. Immunology

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

- 1. Demonstrate pipetting techniques and serial dilutions.
- 2. Perform, interpret and explain the procedural methods for:
  - 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. Perform, interpret, and explain the procedural methods for:
  - a) Rubella
  - b) ANA
  - c) Group A Strep
  - d) RA/RF
  - e) RPR
  - f) CR-P
  - g) Infectious Mono
- 4. Perform, interpret, and explain the test reactions when antibody/antigen complexes appear as:
  - a) Precipitation
  - b) Agglutination
  - c) Flocculation
  - d) Hemagglutination
  - e) Complement fixation reactions
  - f) Fluorescent antibody techniques
  - g) Radioimmune assays

G. Unit VII Urinalysis

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

1. Perform the daily care and preventive maintenance of a microscope to include the performance of the Kohler Illumination Procedure to ensure optimal specimen imaging.
2. Instruct patients with comprehensive “Urine Collection Procedure Instructions” and identify the type of skin disinfectant needed.
3. Adhere to the Chain-of-Custody protocols for Urine Drug Screening collections
4. Identify preservatives used for the collection of 24 hour Urines.
5. Perform, interpret, and explain the diagnostic information obtained from Visual, Chemical, and Microscopic tests performed on:
  - a) Voided urines
  - b) Timed urine specimens
  - c) Midstream “clean catch” urine samples
6. Explain, perform and interpret Confirmatory Tests.
7. Summarize the clinical significance of the following substances when they are found in the urine and describe the chemical principles used on reagent strips to measure them to include the limitations of the leukocyte esterase and nitrite tests.
  - a) Glucose
  - b) Bilirubin
  - c) Ketone
  - d) Specific Gravity
  - e) Blood
  - f) pH
  - g) Protein
  - h) Urobilinogen
  - i) Nitrite
  - J) Leukocyte esterase
8. Identify the following elements found in urine sediment and discuss their clinical significance:
  - a) Bacteria
  - b) Clue cells
  - c) Fat
  - d) Fecal contaminants
  - e) Fibers
  - f) Red Blood Cells
  - g) Mucous threads
  - h) Crystals
  - i) Casts
  - j) Parasites
  - k) Yeast cells

#### H. Unit VIII. Immunohematology

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

1. Perform Quality Control procedures in the Immunohematology Laboratory Department.
2. Follow documentation protocols of the organizational site when recording, processing units, releasing units, and/or cancelling orders.
3. Perform Blood Typing, Reverse Typing, and Antibody Screening procedures.
4. Perform Antibody Identifications.
5. Perform compatibility studies by cross matching blood for:
  - a) A one unit cross match,
  - b) A two unit cross match
  - c) A three (or more) unit cross match
6. Perform Rh immune globulin studies.
7. Perform genotypes and phenotypes of Blood Group A, B, AB, and O.
8. Perform elution studies.
9. Explain protocols for Donor collection and processing procedures.

I. Unit IX. Phlebotomy

At the end of this rotation students will be able to:

1. Demonstrate knowledge, skills, and abilities to perform basic venous and dermal blood collection procedures, Bleeding Times and Sweat Chloride studies.
2. Master use of the Evacuated Tube, Syringe, Winged Infusion and Lancet blood collection systems.
3. Identify the various blood collection tubes and their additives used in clinical laboratories including blood culture tubes.
4. Explain why some collected blood samples need to be:
  - a) Protected from light
  - b) Kept at 37<sup>0</sup> C after drawing and while being transported to the lab
  - c) Submersed in ice water immediately after drawing
  - d) Complete filled (exhausting the vacuum) for blood alcohol levels
5. Perform 35 successful venipunctures and 5 dermal puncture procedures utilizing the various phlebotomy blood collection equipment and supplies.

**III. THECB Learning Outcomes (WECM)**

As outlined in the learning plan, apply the theory, concepts, and skills involving specialized materials, tools, equipment, procedures, regulations, laws, and interactions within and among political, economic, environmental, social, and legal systems associated with the occupation and the business/industry and will demonstrate legal and ethical behavior, safety practices, interpersonal and teamwork skills, and appropriate written and verbal communication skills using the terminology of the occupation and the business/industry.

**IV. Evaluation**

**A. Preassessment**

Official MLT challenge exams have as of yet not been structured. Students wishing to challenge a certain course will be administered written examinations to assess comprehension of didactic material and lab practical exams to assess the clinical laboratory skills demonstrating accuracy and precision. The student must score 80% or higher to successfully complete each examination and meet the minimum competency limits set for individual laboratory skills and abilities.

**B. Postassessment**

1. Quizzes, lecture exams, and a final comprehensive written examination will be used to assess student' 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 and the identification of unknown specimens will require students to demonstrate a particular skill learned in the clinical 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 clinical lab departmental rotation.

**D. Evaluation**

To evaluate students' achievement of course objectives, student grades are tabulated using a final grade break down sheet. To successfully complete MLAB2361 Clinical-

Clinical/Medical Laboratory Technician V, the student must achieve no less than 80% in clinical components. The students overall grade must be no less than “C,” to be allowed to progress to the next program level

#### E. Remediation

If a student scores less than 80% on any clinical quiz, report form, or exam, the instructor will conference with student to discuss different learning, retaining, and studying methodologies. The instructor will discuss possible weakness and/or problem sources, and will help guide student to take remedial steps toward initiating corrective measures.

#### F. Grading

Grading will follow current EPCC Catalog standards. The assignments of letter grades to percentage scores and final grade determination will be as follows:

Average of evaluation	= 20%
Average of quizzes	= 25%
Average of Practicum Exams	= 20%
Average Heme, UA, Coag, BB Testing	= 10%
Final Exam	= <u>25%</u>
Total	= 100%

A minimum grade of 80% is required in each of the three sections to pass this course. Grades will be calculated to the nearest tenth; those at .5 or more will be rounded up to the next whole number, those below .5 will be rounded to that whole number.

#### Grading Scale

A = 94 - 100
B = 87 - 93
C = 80 - 86
D = 73 - 79
F = 72 and below

#### V. Disability Statement (American 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.