El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Medical Laboratory Technology**
COURSE RUBRIC AND NUMBER	**MLAB 1331**
COURSE TITLE	**Parasitology/Mycology**
COURSE CREDIT HOURS	**3 (Credits) 2 (Lec) : 3 (Lab)**

I. Catalog Description

Studies the taxonomy, morphology, and pathogenesis of human parasites and fungi, including the practical application of laboratory procedures, quality control, quality assurance, and lab safety. Includes the study of clinical virology. A grade of "C" or better is required in this course to take the next course.
Corequisite: MLAB 2360. (2:3). Lab fee.

II. Course Objectives

A. Unit I. Safety and QA/QC
1. Demonstrate laboratory safety
2. Participate in Quality Assurance and Quality Control Programs.

B. Unit II. Definition of Clinical Parasitology
1. Define clinical parasitology and explain the varied scope of parasitic disease.
2. Discuss the impact that parasitic diseases have on the populations of third-world countries as opposed to populations living in the European countries and the United States.
3. Briefly discuss the impact parasitic diseases have played in the disease processes of Acquired Immune Deficiency Syndrome.

C. Unit III. Diagnosis of Parasitic Infections
Briefly describe the various types of procedures required to diagnose parasitic infections, to include:
   a. methods for diagnosing blood and tissue parasites
   b. methods for diagnosing intestinal parasites
   c. methods for diagnosing parasitic infections by serology

D. Unit IV. Protozoan Parasites of Man
1. Briefly discuss the following Protozoan pathogens which cause blood and tissue infections. Evaluate the clinical significance and explain how the infection is transmitted and what specimens and procedures are necessary to diagnose the infection.
   a. Plasmodium vivax
   b. Plasmodium falciparum
   c. Plasmodium malariae
   d. Plasmodium ovale
   e. Babesia sp.
   f. Leishmania sp.
   g. Trypanosoma sp.
   h. Toxoplasmosis gondii
   i. Pneumocystis carinii
   j. Acanthamoeba and Naegleria spp

2. Briefly discuss the following Protozoan pathogens which cause intestinal infections. Discuss the clinical significance and explain how the infection is transmitted and what specimens and procedures are necessary to diagnose the infection.
   a. Entamoeba histolytica
   b. Entamoeba hartmanni
   c. Entamoeba coli
   d. Endolimax nana
   e. Iodamoeba butschlii
   f. Balantidium coli
   g. Dientamoeba fragilis
   h. Giardia lamblia
   i. Trichomonas vaginalis (urogenital)
   j. Chilomastix mesnili
   k. Isospora belli
   l. Cryptosporidium sp.
   m. Blastocystis hominis
   n. Cyclospora cayatenisis

E. Unit V. Metazoan Parasites of Man
1. Briefly discuss the following Cestodes which cause human infection and explain how the organism is transmitted and what specimens and procedures are necessary to diagnose the infection.
   a. Diphyllobothrium latum
   b. Taenia saginata
   c. Taenia solium
   d. Hymenolepsis nana
   e. Hymenolepsis diminuta
   f. Dipylidium caninum
   g. Echinococcus granulosus
2. Briefly discuss the following Nematodes which cause human infection. Evaluate the clinical significance and explain how the organism is transmitted and what specimens and procedures are necessary to diagnose the infection.
   a. Filarial lymphatic and tissue Nematodes
      (1) Wucheria bancrofti
      (2) Brugia malayi
      (3) Loa loa
      (4) Onchocerca volvulus
      (5) Mansonella ozzardi
      (6) Mansonella streptocerca
      (7) Dipetalonema perstans
      (8) Trichinella spiralis
   b. Intestinal Nematodes
      (1) Enterobius vermicularis
      (2) Ascaris lumbricoides
      (3) Trichuris trichiura
      (4) Necator americanus
      (5) Ancylostoma duodenale
      (6) Strongyloides stercoralis
3. Briefly discuss the following Trematodes which cause human infection. Evaluate the clinical significance and explain how the organism is transmitted and what specimens and procedures are necessary to diagnose the infection
   a. Intestinal flukes
      (1) Fasciolopsis buski
      (2) Heterophyes heterophyes
      (3) Metagonimus yokogawai
   b. Liver flukes
      (1) Fasciola hepatica
      (2) Opsitrochis sinensis

c. Lung flukes
Paragonimus westermani
d. Blood flukes
(1) Schistosoma mansoni
(2) Schistosoma japonicum
(3) Schistosoma haematobium

F. Unit VI. Mycobacteria Infections
1. Define clinical mycobacteriology and evaluate the clinical significance and discuss the role of mycobacteria in human disease.
a. Explain how the mycobacteria differ from other bacteria in cell wall composition.
b. Explain how culture techniques must be changed to compensate for the slow replication time of the mycobacteria.
c. Discuss the historical significance of mycobacterial diseases such as leprosy and tuberculosis.
d. Discuss the current impact of mycobacterial disease on patients who have acquired immune deficiency syndrome.
2. Briefly discuss the role of non-tubercular mycobacteria and the types of disease caused by atypical mycobacteria.

G. Unit VII. Isolation, Identification, and Susceptibility Testing of Mycobacteria
1. List the different types of media available for culture of mycobacteria and explain the use of selective and non-selective mycobacterial media.
2. Describe the procedures available to concentrate and decontaminate specimens submitted for mycobacterial culture.
3. Discuss the classic staining method for mycobacteria, the-Ziehl-Neelson carbol-fuchsin stain, and compare and contrast this method with the newer method of fluorescent staining.
4. List the main biochemicals necessary to speculate the mycobacteria and briefly explain the use of each test, to include:
a. growth at 37^{o}, 25^{o}, and 42^{o} C. and growth rate
b. photoreactivity tests
c. arylsulfatase
d. catalase
e. iron uptake
f. growth on MacConkey without crystal violet
g. niacin
h. nitrate
i. pyrazinamidase
j. 5% NaCl tolerance test
k. tellurite
l. thiophene-2-carboxylic acid hydrazide
m. tween 80 hydrolysis
n. urease
5. List the tests required to identify a mycobacterial isolate as Mycobacterium tuberculosis.
6. Briefly explain the procedures for performing mycobacterial susceptibility testing and explain why this test is not routinely performed by hospital laboratories.

H. Unit VIII. Fungal Infections
1. Define clinical mycology and discuss the role of fungi in human diseases as causes of infection and allergy and as toxin producers.
a. Explain how fungi differ from bacteria and discuss the importance of fungi in human diseases.
b. Discuss the significance of human fungal diseases and explain why fungal diseases are becoming more prevalent as the number of immunosuppressed patients increases.
2. Explain how culture techniques necessary to isolate fungi from clinical specimens differ from bacterial culture techniques.

3. List the media available for culturing fungi and explain the use of selective and enriched blood media for fungi.
4. Discuss wet mount stains and permanent stains available for detecting fungi in clinical specimens.
5. Discuss the special procedures required to demonstrate the structural relationships of spores and mycelia required for identification of fungi, to include:
   a. tease mounts
   b. scotch-tape preparations
   c. slide-cultures
6. Discuss the identification system for yeast isolates.
   a. yeast screening using the germ tube and chlamydospore
   b. yeast identification by carbohydrate assimilation testing
7. Discuss the use of skin testing for diagnosis of fungal infection.
8. Discuss the diagnosis of fungal diseases using serologic testing.
9. Discuss the scope of fungal diseases and explain how fungal diseases are divided into categories by severity.
   a. superficial mycoses
   b. subcutaneous mycoses
   c. systemic mycoses
   d. opportunistic mycoses
10. Discuss and evaluate the clinical significance of the fungal diseases caused by yeast and yeast-like organisms, to include:
    a. Candida albicans
    b. Cryptococcus neoformans
    c. Candida species (not albicans)
    d. Other yeast species
11. Discuss and evaluate the clinical significance of the fungal isolates which cause superficial cutaneous mycoses, subcutaneous mycoses, systemic mycoses and opportunistic mycoses, to include brief descriptions of the diagnostic stages required for identification.
12. List and discuss the causative agents of these superficial mycoses:
    a. the piedras
    b. the tineas
    c. the dermatophytes
       (1) Epidermophyton
       (2) Microsporum
       (3) Trichophyton
13.. List and discuss the causative agents of these subcutaneous mycoses:
    a. sporotrichosis
    b. Chromoblastomycosis
    c. mycetoma
14. List and discuss the causative agents of these systemic mycoses:
    a. blastomycosis
    b. coccidioidomycosis
    c. histoplasmosis
    d. paracocidioidomycosis
15. List and discuss the causative agents of these opportunistic mycoses:
    a. aspergillosis
    b. zygomycosis
    c. candidiasis
    d. cryptoccosis
    e. fungal keratitis

I. Unit IX. Viral Infections

1. Define clinical virology and discuss the importance of viral infection in human diseases.
   a. Discuss the historical significance of major viral diseases such as small pox, yellow fever, polio, and rabies.
   b. Explain the significance of vaccines in limiting the major childhood diseases of measles, chicken pox, mumps, and rubella.

c. Discuss the historical significance of influenza pandemics and the severity of post-influenza complications.
d. Discuss the common cold and the number of viruses, which can cause a "cold" and explain why the prospects for a vaccine are few.

2. Briefly discuss the clinical significance of the disease caused by each of the following viruses:
   a. Epstein-Barr virus (mononucleosis)
   b. herpes simplex
   c. arboviruses
   d. cytomegalovirus
   e. hepatitis viruses
   f. human papilloma viruses
   g. respiratory syncytial virus
   h. rotaviruses
   i. retrovirus (acquired immune deficiency syndrome)
   j.

J. Unit X. Viral Structure and Mode of Infection
1. Discuss the structure of viral particles, to include:
   a. envelope protein
   b. capsid or protein coat
   c. nucleic acid core
2. Discuss the classification of viruses into two groups, the DNA viruses and the RNA viruses.
3. Diagram the replication of viral particles, showing how the virus attaches to the cell, enters the cell, takes over the protein synthesis of the cell, and begins to make viral particle sub-units and explain how the cell becomes a "virus factory" which assembles and releases new viral particles to infect more cells.

K. Unit XI. Viral Culture
1. Briefly explain the procedure necessary to grow viruses in tissue culture.
2. Discuss the proper methods for general collection of viral specimens and proper methods of preservation until the specimen can be processed.
3. Briefly discuss the use of electron microscopy for detecting viruses in clinical specimens.

L. Unit XII. Serologic Diagnosis of Viral Infections
1. List the various types of serologic tests available for viral diagnosis, to include:
   a. fluorescent antibody tests
   b. enzyme immunoassays
   c. complement fixation
   d. hemagglutination inhibition test
   e. neutralization testing
2. Explain why it is important to test both acute phase and convalescent phase sera for viral antibody.

III. THECB Learning Outcomes (WECM)

1. Apply principles of safety, quality assurance, and quality control.
2. Evaluate specimen acceptability.
3. Describe basic morphology and physiology of parasites and fungi.
4. Classify parasites and fungi.
5. Perform appropriate laboratory techniques used in the processing of specimens and Identification of parasites and fungi.
6. Evaluate and correlate test results with patient condition(s).

IV. Evaluation

A. Preassessment

Official MLT Challenge exams have as yet not been structured. Students wishing to challenge a certain course will be given a series of written examinations to display proficiency of lecture

material and a series of procedures to display proficiency of laboratory material. The student must score a minimum grade of 70% in order to successfully complete each examination and must meet the minimum competency limits set for individual laboratory procedures.

B. Postassessment

Oral and written quizzes will be administered during each unit of lecture material. Written forms for each laboratory procedure are given to the student at the beginning of each laboratory session and are to be completed and presented to the instructor at the next class meeting. Three one-hour examinations and a final examination are scheduled for the course.

C. Final Examination

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

D**. Evaluation**

To evaluate students' achievement of course objectives, student grades are tabulated using a final grade break down sheet. To successfully complete MLAB1331 Parasitology/Mycology, the student must achieve at least a 70% in course components and 80% in lab 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**

No retake will be offered for quizzes or exams, including the final exam. Students will receive a grade of zero on all quizzes missed, with no exceptions. Quizzes will be given Mondays before lecture only, and any student more than 10 minutes late for the scheduled start of class will not be given a quiz and will automatically receive a zero for that quiz. Make-up exams may be given for excused absences on major exams only at the discretion of the instructor.

F. **Grading**

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

Grade Scale:

Lecture	Laboratory
90-100 = A	94-100 =A
80-89 = B	87-93 =B
70-79 = C	80-86 =C
60-69 = D	73-79 =D
59 and below = F	72 and below = F

Grade Determination:

Lecture		Laboratory	
First hour exam	=20%	Practical Exam #1	= 22.5%
Second hour exam	=20%	Practical Exam #2	= 22.5%
Third hour exam	=20%	Practical Exam #3	= 22.5%
Quiz average	=20%	Quiz Average	= 22.5%
Final exam	=20%	Practical Reports	= 10.0%
	100%		100%

*Any number grade with a fraction obtained on any graded work or obtained when averaging grades will be rounded off as follows: any number with a fraction above or equal to 0.5 will be rounded off to the next highest round number (e.g, 85.5 will become 86.0); any number with a fraction below 0.5 will be rounded to the next lowest round number (e.g., 85.4 will become 85.0).

Laboratories will be graded on a Pass/Fail system based on the competency limits set by the program for each individual procedure. A minimum average of 80% will be required of all students to obtain a passing grade for the laboratory. While this may seem to be high, it must be remembered that a laboratory technologist who consistently turned out work at a 20% error rate would not only be likely to lose his or her job, but that such a level of inaccuracy in laboratory results could endanger the patients for whose tests the technologist was responsible.

THE STUDENT MUST PASS THE FINAL LECTURE EXAM WITH A SCORE OF AT LEAST 70% TO SUCCESSFULLY COMPLETE THIS COURSE. THE FINAL AVERAGE OF GRADED LABORATORY MUST BE AT LEAST 80% IN ORDER TO SUCCESSFULLY COMPLETE THE LABORATORY SECTION.

G. **Health Occupations Division Criteria for Course Pursuit**

In order to establish guidelines for determining when a student has ceased to pursue the course objectives, the Health Occupations Division has set the following standards.

1. The student must adhere to the attendance requirements of course MLAB1331. In order to pursue the course, the student must attend a minimum of 24 lecture hours out of 32 total lecture hours and 39 laboratory hours out of 45 total laboratory hours.
2. The student will be able to make up none of the missed lecture hours and up to 3 of the missed laboratory hours by appointment with the instructor.
3. Tardiness will be defined as being 10 minutes or less late to a lecture or laboratory session. Students tardy in excess of the above will be considered absent and this will be considered an unexcused absence. Students will be allowed three events or less of tardiness, after which the tardiness will be considered an absence.
4. If required by instructor/coordinator, student also must follow the standards established in the Allied Health & Nursing Program Student Handbook and/or program addendum. The student is bound by standards in the Allied Health/Nursing Handbook as evidenced by the return of a signed/dated acknowledgment sheet.
5. Where the student continues to pursue the course objectives but is receiving failing grades, he/she will remain eligible to complete the course, except in instances where unsafe practice occurs.
6. The student must appear for examinations, presentations, or other required class activities and submit required papers, projects and/or reports as identified in the course syllabus/calendar.

Failure of the student to follow the above guidelines will indicate that the student is no longer pursuing the objectives of the course and will result in faculty initiated withdrawal.

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.