El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Medical Laboratory Technology**
COURSE RUBRIC AND NUMBER	**MLAB 1231**
COURSE TITLE	**Parasitology/Mycology**
COURSE CREDIT HOURS	**2 (Credits) 1 (Lec) : 4 (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 2361. (1:4). Lab fee.**

II. Course Objectives

LECTURE

(1= Recall, 2 = Interpretation, 3 = Problem Solving)

A. Unit I. Definition of Clinical Parasitology

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

1. Define clinical parasitology and explain the varied scope of parasitic disease. (1)
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. (1)
3. Briefly discuss the impact parasitic diseases have played in the disease processes of Acquired Immune Deficiency Syndrome. (1)

B. Unit II. Protozoan Parasites of Man

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

1. Briefly discuss (1) the following Protozoan pathogens which cause blood and tissue infections, evaluate their clinical significance (3), and explain how infection is transmitted.
   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 (1) the following Protozoan pathogens which cause intestinal infections, evaluate their clinical significance (3), and explain how the infection is transmitted.
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

C. Unit III. Metazoan Parasites of Man

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

1. Briefly discuss (1) the following Cestodes which cause human infection and explain how the organisms are transmitted.
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 their clinical significance (3), and explain how the organisms are transmitted.
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 their clinical significance (3), and explain how the organism is transmitted**.**
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

D. Unit IV. Mycobacteria Infections

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

1. Define clinical mycobacteriology (1), evaluate the clinical significance of various mycobacteria (3), and discuss the role of mycobacteria in human disease (1).
2. Explain how the mycobacteria differ from other bacteria in cell wall composition (1).
3. Explain how culture techniques must be changed to compensate for the slow replication time of the mycobacteria (1).
4. Discuss the historical significance of mycobacterial diseases such as leprosy and tuberculosis (1).
5. Discuss the current impact of mycobacterial disease on patients who have acquired immune deficiency syndrome (1).
6. Briefly discuss the role of non-tubercular mycobacteria and the types of diseases caused by atypical mycobacteria (1).

E. Unit V. Isolation, Identification, and Susceptibility Testing of Mycobacteria

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

1. Briefly explain the procedures for performing mycobacterial susceptibility testing (1) and explain why these procedures are not routinely performed by hospital laboratories (1).
2. Briefly discuss the newer, faster methods for identification and susceptibility testing of mycobacteria and explain their advantages over the traditional methods (1).

F. Unit VI. Fungal Infections

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

1. Define clinical mycology and discuss the role of fungi in human disease (1).
2. Explain how fungi differ from bacteria and discuss how this is important in the treatment of fungal infections (1).
3. Discuss the significance of human fungal diseases and explain why fungal diseases are becoming more prevalent as the number of immunosuppressed patients increases (1).
4. Explain how culture techniques necessary to isolate fungi from clinical specimens differ from bacterial culture techniques (1).
5. Discuss tests and systems used for the identification of yeast isolates (1), to include:
   a. screening tests such as germ tube and chlamydospore production
   b. yeast identification systems using carbohydrate assimilation
6. Discuss the diagnosis of fungal diseases using serologic testing (1).
7. Discuss the scope of fungal diseases and explain how fungal diseases are divided into categories by severity (1).
   a. superficial mycoses

b. subcutaneous mycoses
c. systemic mycoses
d. opportunistic mycoses

8. Discuss (1) and evaluate (2) the clinical significance of 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
9. Discuss (1) and evaluate (2) the clinical significance of fungal isolates which cause superficial cutaneous mycoses, subcutaneous mycoses, systemic mycoses, and opportunistic mycoses, to include brief descriptions of the asexually and sexually produced microscopic structures that allow for their identification.
10. List and discuss the causative agents of these superficial mycoses (1):
    a. the piedras
    b. the tineas
    c. the dermatophytes
       (1) Epidermophyton
       (2) Microsporum
       (3) Trichophyton
11. List and discuss the causative agents of these subcutaneous mycoses (1):
    a. sporotrichosis
    b. chromoblastomycosis
    c. mycetoma
12. List and discuss the causative agents of these systemic mycoses (1):
    a. blastomycosis
    b. coccidioidomycosis
    c. histoplasmosis
    d. paracocidioidomycosis
13. List and discuss the causative agents of these opportunistic mycoses (1):
    a. aspergillosis
    b. zygomycosis
    c. candidiasis
    d. cryptoccosis
    e. fungal keratitis

G. Unit VII. Viral Infections

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

1. Define clinical virology and discuss the importance of viral infection in human diseases (1).
2. Discuss the historical significance of major viral diseases such as small pox, yellow fever, polio, and rabies (1).
3. Explain the significance of vaccines in limiting the major childhood diseases of measles, chicken pox, mumps, and rubella (1).
4. Discuss the historical significance of influenza pandemics and the severity of post-influenza complications (1).
5. Discuss the common cold, the number of viruses which can cause a "cold," and explain why the prospects for a vaccine are few (1).
6. Briefly discuss the clinical significance of the disease caused by each of the following viruses (1):
   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)

H. Unit VIII. Viral Structure and Mode of Infection

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

1. Discuss the structure of viral particles (1), 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 (1).
3. Diagram (1) 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 (1) how the cell becomes a "virus factory" which assembles and releases new viral particles to infect more cells.

LABORATORY

(1= Recall, 2 = Interpretation, 3 = Problem Solving)

A. Unit I. Diagnosis of Parasitic Infections

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

Briefly describe (1) and evaluate (3) the various types of procedures required to diagnose parasitic infections (1), to include:

a. methods for diagnosing blood and tissue parasites
b. methods for diagnosing intestinal parasites
c. methods for diagnosing parasitic infections by serology

B. Unit II. Protozoan Parasites of Man

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

1. Identify the diagnostic stages of the following protozoan pathogens which cause blood and tissue infections (1) and what specimens and procedures are necessary to diagnose infections (1).
   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. Identify the diagnostic stages of following protozoan parasites which may be found in the instestinal tract (1) and what specimens and procedures are necessary to diagnose infections (1).
   a. Entamoeba histolytica
   b. Entamoeba hartmanni
   c. Entamoeba coli
   d. Endolimax nana
   g. Iodamoeba butschlii
   h. Balantidium coli
   g. Dientamoeba fragilis
   h. Giardia lamblia
   i. Trichomonas vaginalis (urogenital)
   j. Chilomastix mesnili
   k. Isospora belli
   l. Cryptosporidium sp.
   m. Blastocystis hominis
   o. Cyclospora cayatenisis

C. Unit III. Metazoan Parasites of Man

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

1. Identify the diagnostic stages of Cestodes which may be found in humans (1) and discuss what specimens and procedures are necessary to diagnose infections (1).
   a. Diphyllobothrium latum
   b. Taenia saginata
   c. Taenia solium
   d. Hymenolepsis nana
   e. Hymenolepsis diminuta
   f. Dipylidium caninum
   g. Echinococcus granulosus
2. Identify the diagnostic stages of Nematodes which may be found in humans (1) and discuss what specimens and procedures are necessary to diagnose infections (1).
   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
      (9) Trichinella spiralis
   b. Intestinal Nematodes
      (1) Enterobius vermicularis
      (2) Ascaris lumbricoides
      (3) Trichuris trichiura
      (4) Necator americanus
      (5) Ancylostoma duodenale
      (6) Strongyloides stercoralis
3. Identify the diagnostic stages of Trematodes which may be found in humans (1) and discuss what specimens and procedures are necessary to diagnose infections (1).
   a. Intestinal flukes
      (1) Fasciolopsis buski
      (2) Heterophyes heterophyes
      (3) Metagonimus yokogawai
   b. Liver flukes

(1) Fasciola hepatica
(2) Clonorchis sinensis

c. Lung flukes
Paragonimus westermani

d. Blood flukes
(1) Schistosoma mansoni
(2) Schistosoma japonicum
(3) Schistosoma haematobium

D. Unit IV. Isolation, Identification, and Susceptibility Testing of Mycobacteria

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

1. List the different types of media available for culture of mycobacteria and explain the use of selective and non-selective mycobacterial media (1).
2 Describe the procedures available to concentrate and decontaminate specimens submitted for mycobacterial culture (1).
3. Discuss the classic staining method for mycobacteria using carbol-fuchsin stain (1) and compare and contrast this method with the newer method of fluorescent staining (2).
4. List the main physical and biochemical tests necessary to presumptively and/or definitively identify the mycobacteria and briefly explain the use of each test (1), to include:
   a. growth at 37º, 25º, and 42º 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 (1) and interpret (2) the tests required to identify a mycobacterial isolate as Mycobacterium tuberculosis.

E. Unit V. Fungal Infections

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

1. List the media available for culturing fungi and explain the use of selective and enriched blood media for fungi (1).
2. Discuss wet mount stains and permanent stains available for detecting fungi in clinical specimens (1).
3. Discuss the special procedures required to demonstrate the structural relationships of spores and mycelia required for identification of fungi (1), to include:
   a. tease mounts
   b. scotch-tape preparations
   c. slide-cultures
4. Identify (1) the fungal isolates which cause superficial cutaneous mycoses, subcutaneous mycoses, systemic mycoses, and opportunistic mycoses through observation of the asexually and sexually produced microscopic structures.

F. Unit VI. Viral Infections

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

1. Briefly explain the procedure necessary to grow viruses in tissue culture (1).
2. Discuss the proper procedures for collection and processing of specimens for viral detection (1).
3. Briefly discuss the use of electron microscopy and nucleic acid amplification methods for detecting viruses in clinical specimens (1).

G. Unit VII. Serologic Diagnosis of Viral Infections

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

1. List and briefly discuss the various types of serologic tests available for viral diagnosis (1), 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 antibodies (1).

III. 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

Written quizzes will be administered during each unit of lecture material. Written forms for laboratory procedures will be given to the student during laboratory sessions and are to be discussed and evaluated with the instructor. Students will be tested on the material discussed and examined. Three one-hour examinations and a final examination are scheduled for the course, and practical examinations will be given in the laboratory.

C. 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
69 and below	= F	Less than 80	= F
Note: No "D" grade given in this course			

Grade Determination:

Lecture		Laboratory	
First hour exam	= 20%	Practical Exam #1	= 25%
Second hour exam	= 20%	Practical Exam #2	= 25%
Third hour exam	= 20%	Quiz Average	= 25%
Quiz average	= 20%	Lab Reports	= 25%
Final exam	= 20%		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 also 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. A FINAL GRADE OF 70 (C) IS REQUIRED TO PASS THE LECTURE PART OF THE COURSE.
THE LABORATORY GRADE IS SEPARATE FROM THE LECTURE GRADE. THE FINAL AVERAGE OF GRADED LABORATORIES MUST BE AT LEAST 80% IN ORDER TO SUCCESSFULLY COMPLETE THE LABORATORY SECTION.

D. 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 Tuesdays 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.

E. 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 MLAB 1231. In order to pursue the course, the student must attend a minimum of 24 lecture hours out of 28 total lecture hours and 32 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.

IV. 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).

V. Six 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.