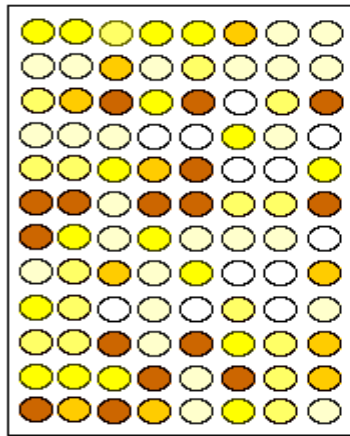


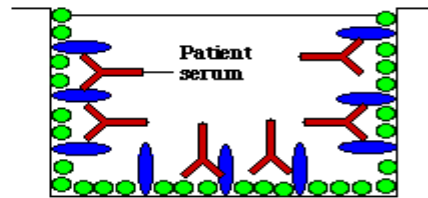
Clinical Laboratory Science Program

CLSC 3161 - Serology Lab

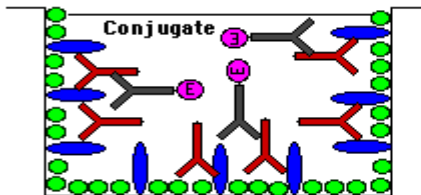
Enzyme Linked Immunosorbent Assay (ELISA)



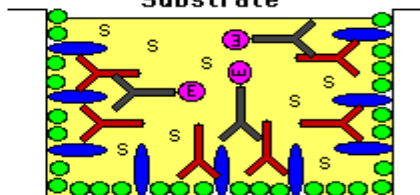
ELISA Plate



Alkaline Phosphatase conjugated to
goat anti-human IgG



p-Nitrophenyl Phosphate
Substrate



The substrate reacts with the enzyme and forms a colored product

Fall 2009

The University of Texas at El Paso
College of Health Sciences
Clinical Laboratory Science Program

Serology Lab CLSC 3161

Section 1 (1-3PM) Section 2 (4-6PM) Tuesday* at CHS 608

Instructor:	<i>Dora E. Meraz M.T. (ASCP), M. Ed.</i>	Phone: 747-7243
Office:	College of Health Sciences (CHS) 618	Fax: 747-7207
e-mail:	(Web-CT account)	

OFFICE HOURS: By appointment and Friday 2pm - 3pm

If you are unable to see me at this time, you may arrange an appointment at another time. You may schedule meetings by WebCT, telephone, or in person after lab session. Please use office hours to clarify lecture objectives, special interests or career goals at the earliest convenience for both parties. The best time to reach me by phone is during posted office hours. If I am unable to answer your call, please leave a detailed message and I'll return your call as soon as possible.

COURSE DESCRIPTION:

CLSC 3161- Serology Lab is designed to complement the lecture course CLSC 3260 with hands-on technical applications of various serological procedures. Serology is a branch of clinical laboratory science that deals with the measurement and characterization of antibodies and other immunological substances in serum and other body fluids. It is the study of serum reactions between an antigen and its antibody. Moreover, serology encompasses specific immune responses occurring *in vivo* but are detected *in vitro*. Currently, the study of serology has broadened including the investigation of problems with the immune system such as autoimmune diseases, determining organ compatibility for transplantation, paternity testing, transfusion medicine, and forensics.

COURSE GOAL:

This course will provide the student with basic serological procedure foundations to promote and facilitate the understanding of this complex science. The student will perform serologic tests presented in lecture and apply theoretical concepts to practice. The student will learn to competently perform serological procedures and correctly interpret the findings given adequate clinical data. The student will accurately distinguish between normal and abnormal results and identify various testing procedures to evaluate the patient results in light of clinical evidence.

COURSE OBJECTIVES:

A. Cognitive

Upon successful completion of the course, the student will be able to:

1. Describe the protective techniques and safety practices utilized in the clinical immunology / serology laboratory and fathom the consequences for not following such techniques and practices.
2. Explain and demonstrate the proper handling of hazardous material and waste management, including infectious waste, chemicals etc.
3. Describe the various quality control procedures performed in the clinical immunology / serology section of the medical laboratory and to comprehend the importance of quality control and quality assurance.
4. Identify, describe, explain and discuss the antigen-antibody interaction and its detection.
5. Define, diagram and explain, compare and contrast and interpret the advantages and disadvantages of a variety of serologic reactions utilized in the serology / clinical immunology section.

6. Assemble and prepare appropriate materials and equipment for the performance of test procedures and determine acceptability of results.
7. Describe a particular dilution in terms of its ratio of component substances.
8. Recognize various expressions of a dilution as different descriptions of the same mixture.
9. Calculate the absolute amount of the substances in a given volume of a dilution.
10. Calculate the amount of a substance needed to make a given volume of a particular dilution.
11. Determine the final dilution of a mixture after adding substances to a known mixture.
12. Describe the procedure for making a dilution series and calculate the concentration and total volume of each dilution in the series.
13. Describe the principles of agglutination; name at least five agglutination methods and the tests identified with each.
14. Compare immunoelectrophoresis and immunofixation electrophoresis.
15. Describe the principle and application of radial immunodiffusion
16. Select reagents, perform procedures, interpret results and evaluate the significance of the results for the following determinations:
 - a. Anti-Streptolysin O
 - b. HCG
 - c. C-Reactive Protein
 - d. Rheumatoid factor
 - e. Infectious mononucleosis
 - f. Anti-Nuclear Antibodies
 - g. ELISA
 - h. Molecular Diagnostics
 - i. Rubella
 - j. RPR

B. Affective Domain

To show the appropriate responsible behaviors, students will demonstrate:

1. A positive attitude by being prepared for lecture and laboratory sessions completing assigned tasks on time and displaying self-motivation.
2. Organization by utilizing time effectively, sequencing and prioritizing tasks for completion with time constraints, and maintaining a neat clean work.
3. Attention to detail by diligently pursuing accuracy and documenting data accurately and legibly.
4. Problem solving ability by explaining purpose of each step in diagnosis, interpretation, procedure, recognizing discrepancies in techniques or procedures and repeating necessary lab tests when necessary.
5. Dependability by following directions, working independently after being given directions.
6. Stability and self-confidence by approaching and performing routine tasks confidently without assistance and maintaining composure.
7. Appropriate interpersonal skills by cooperating and communicating effectively with classmates and instructors and displaying courteous, considerate behavior and appropriate appearance.
8. Ethical behavior and integrity by respecting confidentiality of patient information, complying with professional standards and code of ethics, adhering to safety policies and abiding by all rules and regulations of the institution.

C. Psychomotor Domain

Upon successful completion of the course, the student will be able to:

1. Perform correct pipetting techniques.
2. Select reagents, perform procedures, interpret results, and evaluate the significance of the results for all determinations listed below:

Dilutions	Rubella
Rheumatoid factor	C-Reactive protein
Anti-streptolysin O	Infectious mononucleosis
Febrile Agglutinins	HCG
Anti-nuclear antibodies latex	ELISA

3. Describe the procedure, look at prepared slides (if applicable), interpret results, and evaluate the significance of results for the tests listed below:

Immunodiffusion	ELISA
Ouchterlony Test	ANA (Antinuclear antibodies)
Dot blots	
Western blot	

4. Define terms and describe quality control procedures as they relate to all serological procedures.

COURSE POLICIES:

1) Required Text:

Turgeon, M.L. (2003). Immunology and Serology in Laboratory Medicine (3rd ed). St. Louis, MO. Mosby

Assigned Pages:

Safety techniques	117-128
Serial dilutions.....	495
Agglutination methods.....	131-139
Electrophoresis Techniques	141-148
Miscellaneous Techniques.....	175-183
Streptococcal infections.....	195-205
Acute phase proteins.....	104-109
HCG procedure and handout	136-137
Rheumatoid arthritis.....	421-435
Infectious mononucleosis.....	271-281
Systemic lupus erythematosus.....	401-420



2) Class Attendance: The student is expected to attend *all lab sessions and be on time*, wear protective equipment, and actively participate. It is responsibility of the student to notify the instructor of any absence and to provide legitimate documentation of absence to abide to University regulations. The instructor reserves the right to drop a student due to tardiness or absences when in the judgment of the instructor, a student has been absent to a degree as to impair his or her status relative to credit for the course. The instructor may drop the student from the class with a **W** before the course drop deadline or with an **F** after the course drop deadline. If a student is 10 minutes late this will be recorded as a tardy.

3) Instructional Strategies: The laboratory is competency based. The student must demonstrate their competency to perform the lab procedure at the designated level before they can progress to the next lab. Lab assignments must be written up and the procedures performed within the standard deviation for the procedure and to the satisfaction of the instructor for a pass/fail grade. If they receive a fail grade, the lab must be repeated until the student receives a pass grade. In a competency based program you are either competent to perform the procedure or you are not. No one progresses until they are competent. **THERE WILL BE NO MAKEUP LABS.** All competencies and repeats must be taken the day they are assigned unless extenuating circumstances occur. The student must take the initiative in this course and see that everything is learned and completed. A written exam will also be given for a letter grade and **MUST** be passed with at least the minimum passing grade of 75%.

4) Test Policy: Proficiency testing and quizzes will be given at various intervals on the material covered. No make ups will be offered. If you cannot attend a test for a legitimate reason (death, illness etc.) inform me as soon as possible and we will arrange a time to my schedule. **5% of final grade will be removed if the student misses any of the scheduled assessments for a legitimate reason.** (Make ups exams/quizzes, while they may cover the same material may differ from the exam/quiz taken by the rest of the class in organization, format, or specific item data.) Students should maintain a 75% or above average to continue in the program. Student participations will be taken into account for grade determination. The final grade for the laboratory will be calculated as follows:

a) Assignments and mid-term exam	30%	(50% exam + 50% practical)
b) Quizzes	30%	
c) Attendance & Participation	10%	
d) Final exam	30%	

5) Grading Scale: 90 – 100 =A, 80 – 89 =B, 75 – 79 =C, 70 or below =F

6) Academic Dishonesty: There is a zero tolerance level for academic dishonesty. Absolute honesty and integrity are a critical aspect of your chosen profession. Confidentiality of patient information is another. These must be strictly observed. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or material that are attributable on whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures* (HOP), and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.

8) Supplementary Information:

You are welcome to follow the following link to find information regarding Fall Semester Important Dates:

<http://academics.utep.edu/Default.aspx?tabid=44348>

**SEROLOGY TENTATIVE LABORATORY SCHEDULE
CHS 608 TUESDAY
(SECTION 1) 1-3PM (SECTION 2) 4-6PM**

Week 1	Aug 25	Lab safety, QC, Dilutions, serial dilutions, concentrations
Week 2	Sept. 1	Phagocytosis and Microbial killing by PMNs and Macrophages QUIZ*
Week 3	Sept. 8	Immunodiffusion methods.....
Week 4	Sept 15	Ouchterlony Test Radial Immunodiffusion
Week 5	Sept. 22	Agglutination / Precipitation Methods: Latex AgglutinationC-Reactive Protein Latex AgglutinationAntistreptolysin O Latex Agglutination Rheumatoid Arthritis Latex Agglutination ANA
Week 6	Sept. 29	Flocculation tests RPR QUIZ Direct Bacterial Agglutination discussion Indirect or Passive Hemagglutinationdiscussion
Week 7	Oct. 6	Hemagglutination ABO typing Hemagglutination Infectious Mononucleosis Agglutination Inhibition HCG
Week 8	Oct. 13	Mid-Term Exam (Practical/Written)
Week 9-10	Oct20-27	Electrophoresis Techniques: Immuno-electrophoresis (IEP) Procedure Immunofixation Electrophoresis Procedure
Week 11	Nov. 3	Labeling Techniques –guest speaker Chemiluminescence Quantum Dots (Q dots) Enzyme Immunoassay....ANA (ELISA) ImmunofluorescenceANA
Week 12-13	Nov. 10-17	Molecular Techniques Amplification Techniques Polymerase chain reaction Analysis of Amplification ProductsProcedure DNA Sequencing Hybridization Techniques
Week 14	Nov. 24	Review
Week 15	Dec. 1	Written Final Exam