CLINICAL LABORATORY SCIENCES
CLSC 4116 Advanced Immunology
The University of Texas Rio Grande Valley
Fall 2018

INSTRUCTORS:
Prof. Sandra Tijerina
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Office Hours- Monday 11:00am-1:00pm Tuesday 2:00pm-3:00pm
Wednesday 11:00pm-1:00pm & by appointment.

COURSE: CLSC 4116 Advanced Immunology

PREREQUISITE: Acceptance into the Clinical Laboratory Science Program or special approval

CREDIT HOURS: 1

CONTACT HOURS: Lecture: 1 hour per week

COURSE DESCRIPTION: This course covers advanced concepts in clinical immunology with an emphasis on specialized testing. Topics include hypersensitivity, autoimmune disorders, tumor immunology, immunodeficiency disorders and transplantation.
Prerequisites: CLSC 3513.

FREQUENCY OF OFFERING: Fall Semester only

TEXTBOOK(S): 1. Rittenhouse-Olsen and De Nardin, Contemporary Clinical Immunology and Serology. 1st Ed. Pearson, 2013

ADDITIONAL REFERENCES (Office Reserve or Library)
METHODS OF EVALUATION: Lecture: 95%

Exam1 40%
Exam 2 40%
Assignments 5%
Quizzes 10%

Affective behavior: 5%

GRADING SCALE
A = 90 - 100%
B = 80 - 89%
C = 70 - 79%
D = 65 - 69% *
F = below 65% *

*Not acceptable to meet Program requirements.

STUDENTS MUST PASS THE LECTURE AND AFFECTIVE PORTIONS OF THE COURSE WITH AT LEAST A "C" AVERAGE. SHOULD A STUDENT NOT RECEIVE A PASSING AVERAGE IN A SECTION, THE LOWEST OF THE GRADES WILL BE USED TO ASSIGN THE FINAL GRADE!

COURSE REQUIREMENTS:

1. This is a web augmented course. Blackboard tools such as the Discussion Tool, the assessment Tool, the Assignment tool and Tegrity will be utilized at various times throughout the course. Students may access copies of the power point handouts via blackboard.

2. Affective objectives will be evaluated using the program affective evaluation form. The purpose of this is to develop the professional attributes expected of students during the clinical portions of the program.

3. Students are expected to develop professional attitudes and responsibilities. Therefore attendance is considered as part of the students' overall affective course grade. The student is expected to be on time and attend all lecture sessions. Make ups for exams will only be considered when documentation of a legitimate family emergency or severe illness is presented to the instructor. No makeups for quizzes will be given.

4. Students are expected to help maintain a classroom environment that is conducive to learning. To ensure that all students have the opportunity to gain from time spent in class, students are prohibited from engaging in any form of disruptive behavior. Examples of disruptive behavior include: use of cellular phones or beepers during class, arriving late or leaving class early, missing deadlines, prolonged chattering, reading other materials during class, offensive remarks to fellow students or faculty. Inappropriate behavior in the classroom may result, minimally in a request to leave the class. Patterns of repeated behavior or more severe infractions may be referred to the Dean of Students.

5. Assignments are normally due at the beginning of class. Assignments turned in after class on the assigned date will have the grade dropped 10 per cent per class day unless a doctors' excuse or suitable excuse is presented to the instructor.
6. For this course we may be using the Turning Technologies Response pad system. These are clickers that students use to key in responses to a professor’s questions. They work like remotes and provide the professor with instant feedback of student understanding of lecture content. For example, quizzes can be taken right on the spot which will indicate the level of comprehension of the material. Response pads and codes are available at the University Bookstore. Individuals who already have a compatible response pad system will be able to use the system for this class and do not need to purchase another pad. If you don’t have a Turning Technologies response pad, you will need to purchase a response pad from the bookstore or online at www.turningtechnologies.com. If you purchase your pad online you will need the code for UTRGV which is utrgv (all lower case).

7. University policy requires all electronic communication between the University and students be conducted through the official University supplied systems; namely UTRGV Mail for email or Blackboard for course specific correspondence. Therefore, please use your UTRGV assigned Mail or Blackboard account for all future correspondence with UTRGV faculty and staff.

STUDENTS WITH DISABILITIES:

If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time.

Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu.

Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Online evaluations will be available Nov. 14 – Dec. 5, 2018. Students who complete their evaluations will have priority access to their grades.

SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:

In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.
SCHOLASTIC INTEGRITY:

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in 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. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

VAQUERO HONOR CODE
Honesty, Integrity, & Respect
As members of a community dedicated to honesty, integrity, and mutual respect in all interactions and relationships, the students, faculty and administration of our university pledge to abide by the principles in the Vaquero Honor Code.

- **WE ARE HONEST**
  We do our own work and are honest with one another in all matters. We understand how any act of dishonesty, including cheating, plagiarizing, falsifying data, and giving or receiving unauthorized assistance, conflicts as much with academic achievement as with the values of honesty and integrity.

- **WE HAVE INTEGRITY**
  We do not lie, cheat, steal, or tolerate those who do. We will make personal and academic integrity fundamental in all of our endeavors.

- **WE ARE RESPECTFUL**
  We act civilly and cooperate with one another for the common good. We will strive to create an environment and a culture in which people respect and listen to one another. We recognize a university is, above all, a place for the exchange of ideas, popular and unpopular. It is the one institution in society that encourages challenges to conventional wisdom. Consequently, we pledge to encourage the exchange of ideas and to allow others to participate and express their views openly.

The Vaquero Student Honor Statement:
I pledge I will not cheat, plagiarize, falsify data or give or receive unauthorized assistance on academic work in accordance with the Vaquero Honor Code. I further pledge to support a culture of academic integrity.

Student Guidelines
The student is responsible for seeking a better understanding of any of the concepts discussed above by consulting with a faculty member; visit the library website, and/or calling the Dean of Students Office at 956-665-2260.

Violations of the Vaquero Honor Code should be reported to the faculty in charge of the course or Student Rights and Responsibilities.

The identity of the student reporting violations of the Vaquero Honor Code will be confidential.
until such time as the student chooses to have their identity revealed. The Student Hearing Process and Appeal Procedures outlined in section STU 02–100 of the Handbook of Operating Procedures outlines the rights afforded to students who are accused of violating the Student Conduct and Discipline and the Vaquero Honor Code.

The Vaquero Faculty Honor Statement

I recognize students' rights and pledge to uphold the principles of honesty, integrity, and mutual respect in all interactions and relationships at UTRGV. I pledge to follow the Faculty Guidelines (see below) in treating student academic misconduct.

Faculty Guidelines

The Faculty Senate requests that faculty include the principle statement found above in their course syllabi and refer students to the Student Conduct and Discipline Code for more information.

To preempt violations, instructors shall make an effort to explain to students at the outset of a course or the start of an examination the behavior expected of them when taking examinations or when preparing and submitting other course work. Further, faculty should actively monitor examinations and consider using a plagiarism detection utility or other appropriate software. In all cases of alleged violations of academic integrity, faculty members must maintain confidentiality.

To process violation cases, faculty should follow the procedures outlined in the Academic Dishonesty Sanction Guidelines and HOP/STU 02–100.

Faculty must collect accurate records of an academic integrity violation and submit those records to Student Rights and Responsibilities.

Faculty should encourage students who have been accused of an academic integrity violation to contact Student Rights and Responsibilities, which can serve as a resource.

ATTENDANCE:

Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

COURSE DROPS:

According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas
public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**MAJOR STUDENT LEARNING OUTCOMES:**

Upon completion of the laboratory and lecture sections of the CLS program, the student should be able to:

1. Demonstrate entry level knowledge and skills in the area of hematology.
2. Demonstrate entry level knowledge and skills in the area of clinical chemistry.
3. Demonstrate entry level knowledge and skills in the area of immunohematology.
4. Demonstrate entry level knowledge and skills in the area of clinical microbiology.
5. Demonstrate entry level knowledge and skills in the area of immunology.
6. Demonstrate entry level knowledge and skills in the area of urinalysis and body fluids.

**AFFECTIVE OBJECTIVES:**

Upon completion of the laboratory and lecture sections of this course, the student should be able to achieve the following. Achievement will be met when a minimum score of 70% percent is earned on critical objectives marked with an asterisk

1. Show a concern for his/her own safety as well as those of fellow students by adhering to established safety rules.
2. Demonstrate dependability by attending all lecture and sessions and arriving promptly at the designated time.
3. Follow instructions on procedures and use of materials.
4. Demonstrate an acceptance of responsibility for his/her own learning by consistently preparing for class and laboratory sessions, voluntarily seeking information, asking pertinent questions and setting personal priorities to allow for academic success.
5. Show initiative by completing assigned tasks without reminders and seeking additional tasks as appropriate.
6. Listen attentively during class activities and actively participate in class.

Upon completion of this course and without the aid of notes or textbook, the student should be able to achieve the following Lecture Objectives. Achievement will be met when a minimum score of 70% percent is earned as detailed in the methods of evaluation section of this syllabus.

**LECTURE OBJECTIVES:**

**Hypersensitivity**

1. Define hypersensitivity.
2. Describe the 4 types of hypersensitivity reactions.
3. Compare and contrast the role of antibody, cells and complement in the different hypersensitivity reactions.
4. Differentiate between allergy and allergen.
5. Correlate clinical conditions with each form of hypersensitivity.
6. Given clinical manifestations, diagnose the type of hypersensitivity reaction described.
7. Identify clinical and laboratory methods used to detect and evaluate hypersensitivity.
8. Discuss prophylactic and therapeutic methods for each type of hypersensitivity.
9. List and discuss the 3 phases of type I hypersensitivity.
10. Identify organs affected by the different manifestations of hypersensitivity.
11. Correlate the range of clinical aspects of hypersensitivity with mediators produced.
12. Relate RIST & RAST tests with newer enzymatic allergy tests.
13. Correlate the size of skin test reactions with the amounts of IgE produced.
14. Categorize the mediators produced by basophils and mast cells when allergies occur.
15. Identify causes of mast cell degranulation.

**Systemic Autoimmunity**

1. Explain how gender, genetics and the environment contribute to the etiology of autoimmunity.
2. Identify the mechanisms of immunopathology which cause autoimmune diseases.
3. Describe the etiology of SLE and its clinical manifestations.
4. Identify tests available for diagnosing SLE & RA.
5. Describe the etiology of RA and its clinical symptoms.
6. Identify tests available for diagnosing different systemic autoimmune disorders.
7. Correlate ANA fluorescent patterns with their disorders.
8. Given results from autoimmune testing, identify any follow-up or confirmatory tests necessary.
9. Troubleshoot problems in the interpretation of SLE or RA and identify appropriate corrective action.

**Organ & Tissue Specific Autoimmunity**

1. Define organ-specific autoimmunity.
2. Justify the usefulness of screening tools in diagnosing autoimmune disorders.
3. Discuss the causes, symptoms and management of autoimmune disorders of the following systems:
   a. Endocrine: thyroid gland, pancreas, adrenal gland, reproductive organs
   b. Digestive: intestinal, pernicious anemia, inflammatory bowel, hepatic
   c. Integumentary: pemphigus and pemphigoid, dermatitis herpetiformis
   d. Musculoskeletal: myasthenia gravis
   e. Nervous: multiple sclerosis
   f. Vascular: vasculitis, thrombosis
   g. Pulmonary & renal: goodpasture’s
   f. Exocrine: sjogren’s
4. Discuss causes, symptoms and testing for antiphospholipid syndrome.
5. Given the results from laboratory tests and case history information, interpret the information.
6. Given case history information, plan any additional testing justifying your recommendations.

**Tumor Immunology**

1. Define tumor immunology and immunosurveillance.
2. Identify potential clinical uses for tumor associated antigens.
3. Discuss currently used tumor markers.
5. Cite examples of genetic screening.
6. Justify the clinical importance of tumor antigen monitoring.
7. Select criteria which would allow a tumor marker to be of value as a monitoring marker.
8. Identify antigens currently used for monitoring.
9. Compare and contrast active and passive immunotherapy.
10. Outline the requirements for an antigen to be used as a target for monoclonal antibody based tumor therapy.
11. Explain the importance of the estrogen receptor, progesterone receptor and HER-2 marker.
12. Explain the clinical purpose of radioimmunolocalization.
13. Identify possible staging markers for cancer.
14. Name common markers associated with epithelial tumors, mesenchymal tumors and hematopoietic tumors.
15. Identify currently available antibodies for tumor radioimmunolocalization and tumor radioimmunotherapy.

**Immunoproliferative Disorders**

1. Differentiate between lymphoma and leukemia.
3. Describe the treatment available for macroglobulinemia.
4. Interpret case histories with an emphasis of high risk groups and the clinical manifestations of immunoproliferative disorders.
5. Select and interpret appropriate clinical laboratory tests in diagnosis and evaluation of immunoproliferative disorders.
6. Differentiate between heavy and light chain disease.

**Primary Immunodeficiency**

1. Correlate sample conditions with their immunodeficiencies.
2. Correlate resulting defects with their X-linked immunodeficiencies.
3. Correlate resulting defects with their B cell immunodeficiencies.
4. Correlate resulting defects with their T cell immunodeficiencies.
5. List and describe different forms of severe combined immunodeficiencies and their mechanisms.
6. List and describe examples of immunodeficiency resulting from enzyme defects.
7. Given patient history and symptoms, recommend diagnostic testing and possible treatment modalities.

**Acquired Immunodeficiency**

1. Compare and contrast the CDC and WHO classifications of AIDS.
2. List examples of opportunistic infections found in patients with AIDS.
3. Describe current treatments and diagnostic tests available for HIV and AIDS.
4. Describe how the immune response can accelerate or decelerate HIV infection.
5. Cite examples of the molecular mechanism of acquired immunodeficiencies other than HIV.
Transplantation

1. Identify the most common type of transplantation.
2. Identify histocompatibility antigens involved in transplantation rejection.
3. Define autograft, allograft, isograft and xenograft.
4. Describe methods for HLA typing and for detection of HLA antibodies.
5. Describe the immunologic mechanisms of graft rejection and their clinical symptoms.
6. Describe the events in graft vs host disease.
7. Identify antigen sets used in multiplexing assays.
8. List and describe immunosuppressive agents and their modes of action.

Fungi and Parasites

1. Identify factors associated with worldwide increase in fungal infections.
2. Identify patient information essential to choosing laboratory tests for diagnosing fungi and parasites.
3. Describe antigens used in diagnosing: blastomycosis, moccidiomycosis, cryptococcosis, histoplasmosis.
4. Explain why it is more difficult for the immune response fight off parasites.
5. Identify how parasites evade a host’s defenses.
6. Describe the serological testing and treatment for Cryptosporidium, Giardia and Toxoplasmosis.
7. Describe tests to identify antibodies to Candida.
8. Describe antibody and antigen testing for Aspergillus.
9. Evaluate laboratory test results in order to determine if the patient and an acute or past infection.
10. Describe the effect of immunocompromised states on the outcome of laboratory tests for fungal and parasitic infections.

Forensic Serology

1. Define forensic serology, forensic toxicology and forensic biology.
2. Justify the importance of forensic toxicology.
3. Explain the principle of ELISA testing of biological specimens for drugs of abuse.
4. Describe the principle of tests used for identification of blood.
5. Differentiate between ring precipitin and crossover electrophoresis methods for species Identification.
6. Justify the importance of detecting semen in a sexual assault investigation.
7. State the principle of an immunoassay used to identify semen.
8. Select methods available which can be used to identify saliva from items of evidence.
9. Justify the importance of forensic serology in criminal investigations.

Testing

1. Identify problems in pre-analytic, analytic and post-analytic testing of serological specimens.
# CLSC 4116
## ADVANCED IMMUNOLOGY
### Lecture and Exam Schedule

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<thead>
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<th>DATE</th>
<th>TOPIC</th>
<th>READING ASSIGNMENT</th>
<th>Text</th>
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<tr>
<td>Aug 27</td>
<td>Hypersensitivity</td>
<td>Chapter 9</td>
<td>Rittenhouse-Olsen</td>
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<tr>
<td>Sept 3</td>
<td>Labor Day</td>
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<td>Sept 10</td>
<td>Systemic Autoimmunity</td>
<td>Chapter 10</td>
<td>Rittenhouse-Olsen</td>
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<td>Sept 17</td>
<td>Organ/Tissue Immunology</td>
<td>Chapter 11</td>
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<td>Sept 24</td>
<td>Organ/Tissue Immunology Tegritity</td>
<td>Chapter 11</td>
<td>Rittenhouse-Olsen</td>
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<td></td>
<td>Take Quiz I this week</td>
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<td>Oct 1</td>
<td>Tumor Immunology Tegritity</td>
<td>Chapter 12</td>
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<td>Oct 8</td>
<td>Immunoproliferative Disorders Tegritity</td>
<td>Chapter 13</td>
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<td>Oct 15</td>
<td>Review Questions Study day for Exam I</td>
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<td>Take Quiz 3 this week</td>
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<td>Oct 22</td>
<td><strong>Exam I- Bring Laptops Or IPADS</strong></td>
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<td>Oct 29</td>
<td>Primary Immunodeficiency</td>
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<td>Nov 5</td>
<td>Acquired Immunodeficiency</td>
<td>Chapter 16</td>
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<td>Nov 12</td>
<td>Fungi &amp; Parasites</td>
<td>Chapter 20</td>
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<td>Take Quiz 2 this week</td>
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<td>Nov 19</td>
<td>Transplantation</td>
<td>Chapter 14</td>
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<td>Nov 26</td>
<td>Forensic Serology</td>
<td>Chapter 21</td>
<td>Rittenhouse-Olsen</td>
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<td>Take Quiz 4 this week</td>
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<td>Dec 3</td>
<td>Review</td>
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<td>TBA</td>
<td><strong>Exam II- Bring Laptops Or IPADS</strong></td>
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<td><strong>Quizzes</strong></td>
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<td>Quiz 1 Sept 24-28 Hypersensitivity, Autoimmunity,</td>
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<td>Quiz 2 Oct 15-19 Organ, Tissue, &amp; Tumor Immunology, Immunoproliferative</td>
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<td>Quiz 3 Nov 12-16 Immunodeficiency, Fungi</td>
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<td>Quiz 4 Nov 26-30 Transplantation &amp; Forensics</td>
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