

# Springfield Technical Community College

## ACADEMIC AFFAIRS

Course Number:	CLLS 316	Department:	Clinical Laboratory Sciences
Course Title:	Immunology and Immunoematology	Semester:	Spring      Year:    2014

### Objectives/Competencies

Competencies	Course Objective
<ol style="list-style-type: none"> <li>1. Students will possess an understanding of the course expectations and scope</li> <li>2. Students will apply all safety protocols, universal precautions when practicing laboratory skills. (Re: CLLS-103)</li> <li>3. Students will possess an understanding of basic Immunology terminology.</li> <li>4. Students will list the characteristics of antigens and antibodies.</li> <li>5. Students will describe the difference between types of immunity.</li> <li>6. Students will discuss the use and makeup of common vaccinations</li> </ol>	<ul style="list-style-type: none"> <li>• Review all CLLS affective behaviors required to be a laboratory professional</li> <li>• Discuss student responsibilities as they relate to an active learning classroom</li> <li>• Review semester calendar and due dates</li> <li>• Practice all safety protocols and apply universal precautions when performing laboratory skills in the student laboratory.</li> <li>• Describe the difference between innate and adaptive immunity.</li> <li>• Describe the difference between cellular and humoral immunity.</li> <li>• Define what makes an antigen.</li> <li>• Describe the structure of a typical antibody</li> <li>• List the characterists of the 5 immunoglobulin types found in humans.</li> <li>• Describe innate v adaptive immunity, primary v secondary immunity and cell-mediated v humoral immunity</li> <li>• Describe passive immunity</li> <li>• Discuss the role of adjuvants.</li> </ul>

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<p>7. Students will understand the types of cells involved in the process of Innate Immunity</p> <p>8. Students will describe the other body functions involved in the innate immune response including Phagocytosis and Inflammation.</p> <p>9. Students will identify the types of cells involved in the Processes of Adaptive Immunity.</p> <p>10. Students will describe the MHC – Major Histocompatibility Complex and its function.</p> <p>11. Students will list the Soluble Mediators and describe their function within the immune response:</p> <ul style="list-style-type: none"> <li>▪ Complement, Cytokines, Interleukins, and Interferons</li> <li>▪ The Complement System</li> </ul> <p>10. Students will list the types of methodology used in Serology Testing – Laboratory techniques</p>	<ul style="list-style-type: none"> <li>• List the types of granulocytes and mononuclear cells involved in innate immunity</li> <li>• Describe the function of each cell and instances in which they are elevated.</li> <li>• List the steps in the process of phagocytosis.</li> <li>• Explain the importance of phagocytosis in both natural and acquired immunity.</li> <li>• Describe the process of inflammation.</li> <li>• List the acute phase reactants involved in innate immunity</li> <li>• Describe the maturation process of T cells and B cells.</li> <li>• Describe the role of B cells and T cells in immunity.</li> <li>• Define the MHC and discuss their function in regards to T cell activation.</li> <li>• Discuss the differences between class I and class II molecules and their roles in adaptive immunity.</li> <li>• Identify the components of the complement system</li> <li>• Discuss the complement activation pathways</li> <li>• Describe the effects of increased or decreased complement on the immune system</li> <li>• Define avidity and affinity</li> <li>• List and describe methods in which precipitation reactions may be measured</li> <li>• Describe the steps involved in the agglutination process</li> <li>• Review and describe the types of labeled immunoassays and how they are used</li> </ul>

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<p>11. Students will describe the body's Immune Response to Infectious diseases such as:</p> <ul style="list-style-type: none"> <li>▪ Syphilis, Hepatitis, HIV, Infectious Mononucleosis, Streptococcal infections</li> </ul> <p>12. Students will understand the mechanisms that lead to Immunologically related disorders such as:</p> <ul style="list-style-type: none"> <li>▪ Hypersensitivity</li> <li>▪ Immunoproliferative disorders</li> <li>▪ Autoimmune Disease – Lupus, Rheumatoid arthritis,</li> </ul> <p>14. Students will review and apply medical terminology and general knowledge, principles of immunology concepts as they apply to the immunohematology laboratory</p>	<ul style="list-style-type: none"> <li>• Discuss automated methods to measure antigen-antibody reactions.</li> <li>• Describe important characteristics of infectious disease</li> <li>• Describe the body's response to infectious disease</li> <li>• Differentiate the response of the immune system to intracellular and extracellular organisms</li> <li>• List specific examples of bacterial and viral infections and describe the body's immune response</li> <li>• Describe the general characteristics of autoimmune disorders</li> <li>• Describe the role of the immune system in autoimmune disorders</li> <li>• Describe the types and mechanisms of hypersensitivity</li> <li>• Describe the specific laboratory tests to diagnose SLE and RA</li> <li>• Describe the various fluorescent ANA patterns in the diagnosis of SL.</li> <li>• Describe the Ag/Ab reaction and how we visualize it in the laboratory</li> <li>• Give examples of agglutination, hemolysis, and neutralization reactions and describe the appearance of a positive and negative result</li> <li>• List at least 3 factors that affect agglutination</li> <li>• Define AHG and list its applications in the blood bank laboratory</li> <li>• Discuss and compare the characteristics of IgG and IgM antibodies and determine which class will;             <ul style="list-style-type: none"> <li>○ React at room temp or 37 degrees C</li> <li>○ Cross the placenta</li> <li>○ Activate complement</li> <li>○ Be part of the primary or secondary immune response and in what amounts</li> </ul> </li> </ul>



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<p>19. Discuss the RBC antigen system that determines Rh status and perform Rh testing in the laboratory</p> <p>20. Students will discuss the other common blood groups including; Kell, Duffy, Kidd, MNS, Lewis, Ii, and Diego</p> <p>21. Students will describe and perform antibody testing methods</p>	<p>determine which type of blood should be given if a discrepancy is found.</p> <ul style="list-style-type: none"> <li>• Recognize the presence or absence of agglutination while performing the tilt tube method with an agglutination reader</li> <li>• Explain the secretor test and interpret results</li>   <li>• Discuss the relation of the D antigen to Rh status</li> <li>• Describe the different types of nomenclature and be able to translate between the three methods</li> <li>• Categorize Rh antibodies as IgG or IgM immunoglobulins and discuss how they are formed.</li> <li>• Perform Rh testing in the laboratory using the tilt tube method</li> <li>• Summarize the procedure for Rh testing including Weak D testing</li> <li>• List all reagents used in Rh testing and describe control reagent</li>   <li>• List the other RBC antigen groups including Kell, Duffy, Kidd, Lewis, Ii, MNS, and Diego</li> <li>• Using class notes, complete a chart that describes the antigens, antibodies, inheritance, fetal development and clinical significance.</li> <li>• Describe what is unique to each blood group.</li> <li>• Define dosage and give an example of its application to antibody testing.</li>   <li>• Explain the difference between the IAT and DAT</li> <li>• List uses for each test</li> <li>• Define zeta potential and how it is related to agglutination</li> <li>• Determine the blood type and number of cells used for panels</li> <li>• List the reagents used in the antibody screen and their uses</li> <li>• Observe/explain gel testing techniques</li>   <li>• Understand the concept of heterozygous and homozygous cells</li> </ul>

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<p>22. Students will describe and perform antibody identification techniques</p>	<ul style="list-style-type: none"> <li>• Understand how clinical significance is related to type of immunoglobulin and reaction temperature</li> <li>• Practice and demonstrate the Elimination method, inclusion method, and rule of threes.</li> <li>• Define other techniques such as: enzyme treatment, elution, adsorption, and absorption</li> </ul>
<p>23. Students will determine compatibility between recipient serum and donor red blood cells</p>	<ul style="list-style-type: none"> <li>• Understand the importance of patient identification in blood bank testing</li> <li>• Explain the different types of crossmatches and when they are used: Immediate spin, Abbreviated, Antiglobulin, and Computer</li> <li>• List, in order of preference, which type RBC unit would be used for each patient</li> </ul>
<p>24. Students will identify and give examples of various blood components and appropriate patient uses for such products</p>	<ul style="list-style-type: none"> <li>• List the type of blood products available and describe the use.</li> <li>• Determine what type of blood is needed for each type of transfusion in terms of antigen type, antibody type, and preparation of cells (irradiation, CMV status).</li> </ul>
<p>25. Students will describe methods used for blood product processing and storage.</p>	<ul style="list-style-type: none"> <li>• Explain how each of the following blood products are prepared; Whole blood, Packed Red Blood Cells, FFP, platelet concentrates, cryoprecipitate</li> <li>• List the optimal storage temperatures and maximum shelf life for each product</li> <li>• Determine the blood type of universal donor and universal recipient for whole blood, PRBC, and FFP</li> <li>• Describe the procedures that are available to remove excess WBC's from blood products</li> </ul>

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<p>26. Students will discuss the possible adverse effects of blood product transfusions</p>	<ul style="list-style-type: none"> <li>• List the possible adverse affects of transfusions and explain how they may occur</li> <li>• List and define the different types of transfusion reactions including; IHTR, febrile, urticaria, bacterial, and DHTR</li> <li>• List and explain the steps in a post-transfusion reaction workup</li> <li>• Determine the type of post-transfusion specimen(s) needed for a reaction workup</li> <li>• List and define the different types of transfusion including: autologous, intrauterine, and exchange</li> <li>• Give an example in which you would use each type of transfusion</li> </ul>
<p>27. Students will identify donor selection protocols and procedures</p>	<ul style="list-style-type: none"> <li>• Demonstrate patient identification procedure in the blood bank</li> <li>• Demonstrate specimen labeling criteria in the blood bank</li> <li>• Recognize normal ranges for pre-collection testing results</li> <li>• List the serology tests performed on blood products</li> <li>• List the components of the donor screening process</li> <li>• List the conditions that require permanent or temporary deferral of a blood donor</li> <li>• Determine the volume of blood drawn for a unit of blood</li> <li>• Give an example of confidentiality issues that may occur with blood donation, and describe how the issue may be resolved.</li> </ul>
<p>28. Students will discuss the causes and clinical manifestations of hemolytic disease of the newborn.</p>	<ul style="list-style-type: none"> <li>• Describe how HDN occurs</li> <li>• List the antibodies most commonly responsible for the disease</li> <li>• Describe common testing methods form fetal-maternal bleeding including the rosette test and Kleihauer-Betke</li> <li>• Define Rhogam and explain when it is given to mothers</li> <li>• Relate dosage of Rhogam to volume of FMH</li> </ul>

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<p>30. Students will briefly describe the HLA system</p> <p>31. Students will adhere to all affective behavioral objectives</p>	<ul style="list-style-type: none"> <li>• Describe how the HLA typing is determined</li> <li>• List situations in which HLA typing is used</li> </ul> <ol style="list-style-type: none"> <li>1. <b>Safety</b> <ol style="list-style-type: none"> <li>a. Comply with all established laboratory safety regulations including:               <ol style="list-style-type: none"> <li>i. Standard precautions including PPE use and handwashing.</li> <li>ii. Practice proper handling and disposal of biohazardous materials.</li> <li>iii. Proper handling and disposal of sharps.</li> <li>iv. Exercise proper safety practices when using all laboratory equipment, reagents and chemicals.</li> </ol> </li> <li>b. Comply with established departmental dress code.</li> </ol> </li> <li>2. <b>Work Practices and Organization</b> <ol style="list-style-type: none"> <li>a. Adhere to department attendance policies by arrive to lecture/ laboratory at the expected time, as denoted in the course syllabus.</li> <li>b. Follow all written instructions.</li> <li>c. Actively listen to verbal instructions.</li> <li>d. Ask quality questions (clarifying, analytical and related to task).</li> <li>e. Submit neat, legible, organized and complete assignments.</li> <li>f. Demonstrate effective time management and complete all tasks within the assignment time frame.</li> <li>g. Keep all laboratory work areas neat, clean and in order.</li> <li>h. Properly care for and use all laboratory equipment.</li> <li>i. Achieve competency and independence in performance of all demonstrated lab skills.</li> </ol> </li> <li>3. <b>Cooperation and Teamwork</b> <ol style="list-style-type: none"> <li>a. Actively participate in class activities and discussions by:               <ol style="list-style-type: none"> <li>i. Effectively communicating with class members.</li> <li>ii. Showing respect and consideration for other students and</li> </ol> </li> </ol> </li> </ol>



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	<p>instructors.</p> <ul style="list-style-type: none"> <li>iii. Willing to share ideas and equally contribute to assigned tasks.</li> </ul> <p>b. In laboratory sessions:</p> <ul style="list-style-type: none"> <li>i. Share resources and equipment.</li> <li>ii. Work cooperatively by adjusting work style and speed.</li> <li>iii. Discuss equitable task allocation and organization prior to performing.</li> </ul> <p><b>4. Ethics and Professionalism</b></p> <ul style="list-style-type: none"> <li>a. Respond maturely to constructive criticism and instruction and make appropriate modifications.</li> <li>b. Seek advice when necessary, admitting limitations when appropriate.</li> <li>c. Recognize and admitting errors.</li> <li>d. Maintain patient confidentiality according to HIPPA regulations.</li> <li>e. Communicate using appropriate terminology and professional procedures.</li> <li>f. Display calm demeanor in all circumstances and maintain work quality under stress.</li> </ul>