Course Description: This course provides an overview of immunology, the branch of biology that describes how organisms recognize, attack and destroy foreign invaders, and how the organism distinguishes between self and non-self. This course emphasizes the specific cells, soluble molecules, and proteins that comprise both innate and adaptive immunity, and the interactions between both branches. The laboratory component is designed to demonstrate some of the basic principles involved in immunology.

Student Learning Outcomes:
At the end of the course, the student will be able to:
1. Interpret the role of mononuclear phagocyte in immunity and inflammation;
2. Compare and contrast innate versus adaptive immunity;
3. Illustrate the role of antigen recognition, processing, and presentation in adaptive immunity;
4. Evaluate the role of the major histocompatibility complex with antigen recognition;
5. Describe the genetic basis of diversity in antigen recognition by B and T lymphocytes;
6. Compare and contrast the roles of cytokines and other soluble factors in immunity;
7. Differentiate the roles of Toll-like receptors,
8. Distinguish the role of cells in the regulation of immune responses;
9. Compare and contrast the three branches of complement and describe the outcomes of the components of these branches in immunity and inflammation;
10. Categorize the types of hypersensitivity reactions;
11. Explain the development of self-tolerance and immunity;
12. Critique the roles of scientists who have made substantial contributions to immunology;
13. Assess the roles of adaptive immunity in the pathology associated with AIDS and selected immunodeficiencies;
14. Produce a scientifically-accurate, current, classroom presentation on a topic in immunology to upper-level undergraduates.

Purpose: The course is offered to give graduate students a detailed and exhaustive survey of how organisms identify and recognize self versus non-self, and how organisms repel these invaders. Also, the course also gives graduate students the opportunity to read primary journal articles that focus on aspects of current research, and to develop the ability to teach current information in immunology to undergraduate students.
Audience Defined: This course is for first-year M.S. and Ph.D. students who have not previously taken a course in immunology at the college level.

Prerequisites: A general-level sophomore introductory course in microbiology (Texas Common Course no. BIOL 2421 or its equivalent) using one of the following texts: Alcamo, Baumann, Lin, Harley and Prescott, Nester et al., Madigan et al. BIOL 3345 Cell Physiology and BIOL 3410 Cell Biology are strongly recommended.

Textbooks and Readings:
Parham, Peter. 2009. The immune system, 3rd ed. New York: Garland Science. While this text is highly suggested, any of the following textbooks may also be used:


Further readings

Also included are primary journal readings from *Journal of Immunology* and *Infection and Immunity*.

Supplies/materials required: Textbook, lab coat, safety goggles or glasses, lab notebook. Please wear lab coats, cover legs (no shorts), closed-toed shoes (no sandals, mules, Crocs®, flipflops, etc.). While you should have your own cloth lab coat, we may ask you to purchase disposable lab coats for three labs involving pathogens (Lab 2) and blood (Labs 3-5). We also
need to you have and wear when requested laboratory safety goggles (preferred) or safety glasses (adequate) for the pathogens and blood labs.

**Audience Defined:** Junior and senior Biology and BIMS students with knowledge of Microbiology, Genetics, Cell Biology or Physiology, and Biochemistry, and the ability to integrate knowledge from these fields in learning and expanding upon how organisms identify and eliminate invaders. This course is very useful for those majors planning to attend graduate (MS, PhD) and professional schools (MD, DO, PharmD, PA, OD, DDS), and for future clinical laboratory science (CLS) professionals.

**Microbiology/Biomedical Lab Coordinator**
Ms. G. Brooke Stanford  
CS 253  
brooke.stanford@tamucc.edu

**Laboratory component:** Lab sections will be held in ST 301. Note that labs start the week of January 18 with Lab Safety; come prepared with Lab Safety quiz printed out; lab coat; closed-toe shoes, long pants. Wet labs start the week of January 25.

**Laboratory TA**—Alexis Galvan, MS

**REQUIRED UNIVERSITY POLICIES**

**Students with Disabilities and Veterans:** All programs in Life Sciences (LSCI) comply with the federal Americans with Disabilities Act (ADA) of 1990, including the ADA Amendments from 2008 (PL 110-325). This anti-discrimination statute provides civil rights protection for persons with disabilities. This statute requires that all qualified students with disabilities be guaranteed a learning environment that provides reasonable accommodations of their disabilities. This act also includes returning veterans who may be experiencing cognitive and/or physical access issues in the classroom or on campus. If you are a returning veteran or you suspect that you may have a disability requiring accommodation, please contact the Office of Disability Services (located in Driftwood 101) at (361) 825-5816. Please contact this office in a timely manner, as they must review requests and prepare accommodations and send the accommodation letters.

If you need disability accommodations in this class, please contact the instructor as soon as possible. If you have mobility problems, are pregnant, or you may have a history of seizures, please notify the instructor PRIVATELY so that assistance can be given in case of fire drills or emergencies. Please have your Faculty Notification Letter from the Disabilities Service Office when you talk with Dr. Buck.

**Grade Appeals:** As stated in the Texas A&M University-Corpus Christi University Rules and Procedures (Section B [Academic Program], Part 13 [Students]: 13.02.99.C2 [Student Grade Appeals] and 13.02.99C2.01 [Student Grade Appeal Procedures]), any student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is on the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the
process and the number of days allowed for completing the steps in the process, consult the University Rules and Procedures specified above (accessible through the University Rules and Procedures website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html)). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Academic Advising:** The College of Science and Technology requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in Faculty Center 178, and can be reached at 825-6094.

**CLASS POLICIES**

**Attendance:** Students are expected to attend every scheduled class and laboratory meeting. **It is the responsibility of the student to obtain any material missed during an absence from his/her classmates.** Power Points are not placed in the library, nor on a website such as WebCT. For labs, the instructor (TA) should be notified PRIOR to lab if the student will be absent (except in emergency situations). Students must attend the laboratory section for which they originally registered. “Make-up” by attending other lab sections is NOT permitted except in emergencies, only with a signed green permission slip from Dr. Buck.

There are points for attendance (50 pts) for the lecture of this class. Missed extra credit assignments cannot be made up for unexcused absences; approved University absences may be given alternative extra credit work which may NOT be identical to the missed assignment. Two unexcused absences are allowed for this class. **You will get 10 points subtracted for the first unexcused absence (receive 40), 20 for the second (receive 30), and 50 pts for the third (receive zero).** Three unexcused tardies equals one unexcused absence. Please note that instructor determines what is not excused. I define excused absences as emergency visits to the ER or physician or dentist; job, graduate and professional school interviews; death of close family members (siblings, in-laws, parents, step-parents, grandparents or great-grandparents, first cousins), or University-approved absences as described in the Catalogue and Student Handbook.

**Late work:** Students will be given a Late Assignment Penalty for tardy work: 10% assignment grade deduction per class day late. However, after the 3rd day, late assignments will not be accepted. In-class late assignments are defined by being turned in after 12:35 pm, and for lab, five minutes after lab starts. Please note that class (NOT Lab) assignments may be sent to me by e-mail or slid under my office door; tardiness is determined by the time noted on the instructor’s Inbox, but allowances can be made for server problems. Files contaminated by viruses, spyware, and worms will not be accepted. DO NOT ASK THE CUSTODIANS to let you into my office to place an assignment on my desk.

**Missed exams and quizzes:** Students have two choices for making up exams due to excused absences. They can do an all-essay make-up exam, or the percentage grade of the questions from that section on the final exam can be used. There is no make-up for missed quizzes in lecture or lab, nor for missed exams due to excused absences. Missed extra credit opportunities may or may not be given make-up assignments, depending upon the nature of the assignment.
Academic Integrity: TAMUCC academic policies are in force, including standards for academic integrity & honesty, plagiarism, grammar and spelling. All policies are described in the TAMUCC catalogue and the Code of Conduct in the Student Handbook. While lab partners are expected to share some level of information regarding the lab exercises, the lab worksheets should be written individually! Shared information is PLAGIARISM, AND YOUR TA WILL AWARD ALL OFFENDING PARTIES A ZERO ON THE ASSIGNMENT! We also have to report all instances of cheating to the Dean of Students office on an Academic Misconduct form.

Citation format: Please use Council of Science Editors format. If you don’t know this, ask someone in Pro Skills!

Professional Courtesy: DO NOT USE CAMERA PHONES IN LECTURE OR LAB. DO NOT SEND TEXT MESSAGES DURING CLASS. Please turn off all cell phones, beepers, Bluetooth devices, Palm Pilots, Black Berries, etc., before entering the classroom or laboratory, or at least place them on silent mode. Please place these in the lockers outside CS 233 (locks not provided). I would prefer that earpieces not be worn in lecture or laboratory. Recording of lectures with tape recorders can only be done with permission of instructor. Please refrain from eating in class; if you must eat for medical reasons, please see me privately.

List-serve: All students must subscribe to the class list serve, and to a second list serve. To subscribe, send a separate e-mail to each of the following addresses: biol4406-list-request@sci.tamucc.edu and opportunities-list-request@sci.tamucc.edu. Make sure that your e-mail appears in the “From” heading. In the subject heading, type “subscribe,” then send the e-mail. Next, you will receive a second message with a long set of letters and numbers in the subject line. You must also reply to that message in order to be subscribed to the list-serve.

After the initial message to subscribe, to send items on the list-serve, just type biol4406-list@sci.tamucc.edu (do NOT add –request after list). You may not receive the messages from the list-serve if your Internet service provider (Yahoo, Hotmail, Excite, Roadrunner, Grande, etc.) keep these messages from being placed in junk-mail. The University administration prefers that you use the islander.tamucc.edu accounts.

At the end of the course, send an e-mail that contains your e-mail address in the “From” heading to biol4406-list-request@sci.tamucc.edu. In the subject heading, type the word “unsubscribe,” then send the e-mail. I hope that students will continue to subscribe to opportunities-list@sci.tamucc.edu!
GRADED ACTIVITIES--Evaluation
Lecture—Three written exams will mostly consist of multiple-multiple choice (Type K), but may also include a mixture of these plus short answer, essay, multiple choice, multiple-multiple matching, descriptive T/F.

Quizzes will be given at the beginning of class—there are no make-ups for the quizzes. Quiz points can be made up by doing any assigned extra credit.

Power Point presentation—Students will research a current topic related to current topics in immunology (but NOT discussed in class or presented in lecture), and using a minimum of at least three primary journal articles and one review, present a 15-20 min Power Point lecture on the topic. They will also design at least 8 multiple choice questions and one short answer question for possible use on a test. The basis for evaluation will be a rubric with 50% of the grade determined by the instructor, and 50% determined by the undergraduate and other graduate students. The rubric (see Appendix) will allow grading of the presentation based on format, scientific content, and oral presentation. The instructor will grade the proposed exam questions.

Lecture
Attendance = 50 pts
Quizzes (5 or 10 pts each) = 50 pts
3 class exams @ 100 pts. each = 300 pts max
Cumulative final exam = 200 pts
Power Point presentation =100 pts
Questions =50 pts

Total 750 pts
Extra credit assignments ~30 pts.—To be announced
(given at prerogative of instructor)
Lecture is 66.7% of total grade

Lab
Quizzes (5 or 10 pts each) =50 pts no make-ups for quizzes
Lab Practical Exam =50 pts
Lab Worksheets (10 pts each) =100 pts
Oral Lab presentation =100 pts

Total 300 pts

Lab is 33.3% of total grade

Final Exam: R May 6 11 am-1:30 pm  NOTE CHANGE OF TIME
Grading scale: A>90%  B=80-89.9%  C=70-79.9%  D=60-69%  F<60%

Important Dates: Deadline to drop course with a “W” grade: F Apr 2
     Deadline to withdraw from University for the semester: M May 3
Test Dates: Exam 1—T Feb 23; Exam 2— R Mar 25; Exam 3—T Apr 20
Presentation of Power Points in class: April 27, 29
Please note that material presented on the Thursday before Spring Break is FAIR GAME on Exam II!

N.B: You will have a Lab Practical Exam, lab poster presentations, and either pop quizzes or extra credit assignments during the Dead Week (final week of classes, M T May 3-4*).

LAB SAFETY BRIEFINGS: You must either do either a Lab Safety Briefing (SMTE 0091) on-line or in-person to be admitted into your lab; failure to attend will result in your dismissal from the lab.

Rubric--Power Point Presentations BIOL 5406 Spring 2010 Professor edition
Name of presenter ___________________________   Start time_____ End time ______

Directions: Score as follows:0= Missing  1= Poor  1.5= Suboptimal  2=Fair  3= Good
4=Very Good  4.5= Excellent  5=Flawless

Format
1. Student has 20-25 slides with consistent format, background, and color scheme ______
2. Narrative slides are legible and do not have too many words/facts on a single slide ______
3. Narrative slides contain tables, figures, and graphs that help to tell the story____
4. Graphs/tables are clear, concise and accurate with correctly-labeled axes, labels____
5. Order of presentation tells a clear, logical story of the information presented. ______

Content
1. Student had sufficient knowledge about area of presentation. ______
2. Student understood area well enough to explain content. ______
3. Student presented scientific content in a coherent fashion. ______
4. Student cited/acknowledged work done by others. ______
5. Student can integrate immunological topic with previous science learned.

Oral Presentation of Power Point Presentation
1. Presenter spoke in 15-20 minutes. ______
2. Presenter gave presentation in IMRAD form____
3. Presenter clearly articulated major points of the work.____
4. Presenter gave a talk that was concise in describing work presented. _____
5. Presenter gave a talk that was relatively free of grammatical errors. _____
6. Presenter adequately handled questions at the end of the presentation. ______
7. Presenter spoke without many pauses, giggles, “uhhs,” “you knows,” and “likes.” _____
8. Presenter exhibited professionalism in making presentation. ______
9. Presenter gestured to words/graphics.____
10. Presenter talked to audience, not to wall, slides, or inanimate objects. ______

Final score given by instructor ______
Average number of points from peers____
Average of two scores __________________
(Score avg/100)= ____________ Final Grade
## ADDITIONAL INFORMATION OF INTEREST

Other useful textbooks:
Philadelphia: Elsevier/Mosby

Philadelphia: F.A.Davis

Web sites involving immunology (if you use them for laboratory reports, please cite them, and add date accessed using Council of Science Editors format):
Microbiology Online: [http://pathmicro.med.sc.edu/book/welcome.htm](http://pathmicro.med.sc.edu/book/welcome.htm) (accessed 01/10/10) --Online text from Med. Univ. of South Carolina. It is intended for 2nd-yr. med students, but if you aspire to advanced degrees, viewing this site will not hurt! The Spanish edition is maintained by the Instituto Polytecnico Nacional ([http://pathmicro.med.sc.edu/Spanish/bact-span.htm](http://pathmicro.med.sc.edu/Spanish/bact-span.htm)) (25 agosto 2009).

CDC: www.cdc.gov (accessed 08/24/09)
Pasteur Institute (In French; click the top right corner button for English): [www.pasteur.fr](http://www.pasteur.fr) (visualisé 10 janvier 2010; Lo siento, no se puede haz clic por los sitios en español)

## Tentative Lecture Schedule  BIOL 5406.001 Spring 2010

Caveat: The syllabus is a general guide; deviations may be necessary. Responsibility to keep up with the changes in the syllabus lies with the student!

**Chapter assignments from Parham 3rd ed. in bold;**  
**Chapters from Kuby et al in regular font**

<table>
<thead>
<tr>
<th>Week</th>
<th>Lec #</th>
<th>Date</th>
<th>Topic</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>R Jan 14</td>
<td>Intro. to Immunology -Cells &amp; Organs</td>
<td>Ch. 1, 10; Ch. 2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>also Parham pp.186-89</td>
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<tr>
<td>2</td>
<td>2</td>
<td>T Jan 19</td>
<td>Innate Immunity</td>
<td>Ch. 2; Ch. 3</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>R Jan 21</td>
<td>Antigens/Antibodies I</td>
<td>Ch. 3, 4, 9, 10; Ch.4,6</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>T Jan 26</td>
<td>Antigens/Antibodies II</td>
<td>Ch. 3, 4, 9, 10; Ch. 4,6</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>R Jan 28</td>
<td>Methods in Immunology</td>
<td>Not in Parham; Ch. 6</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>T Feb 2</td>
<td>Ag Processing/Presentatn I</td>
<td>Parham 124-44; Ch 8</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>R Feb 4</td>
<td>Ag Processing/Presentatn II</td>
<td>Parham 124-44; Ch 8</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>T Feb 9*</td>
<td>Organization of Ig Genes I</td>
<td>Ch. 4, 9, 10; Ch. 5</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>R Feb 11*</td>
<td>Organization of Ig Genes II</td>
<td>Ch. 4, 9, 10; Ch. 5</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>T Feb 16</td>
<td>Complement I</td>
<td>Parham pp. 31-42; Ch.7</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>R Feb 18</td>
<td>Complement II</td>
<td>Parham pp. 31-42; Ch.7</td>
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<tr>
<td>Week</td>
<td>Lec #</td>
<td>Date</td>
<td>Topic</td>
<td>Assignment</td>
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<tr>
<td>7</td>
<td>12</td>
<td>T Feb 23</td>
<td>Exam I</td>
<td>Lec 1-11</td>
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<tr>
<td></td>
<td>13</td>
<td>R Feb 25</td>
<td>Major Histocompatibility Complex; T cell receptors</td>
<td>Ch. 5; Ch. 8</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>T Mar 2</td>
<td>T cell development</td>
<td>Ch. 7</td>
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<td></td>
<td>15</td>
<td>R Mar 4</td>
<td>T cell-med. immunity</td>
<td>Ch. 8</td>
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<tr>
<td>9</td>
<td>16</td>
<td>T Mar 9</td>
<td>B cell development</td>
<td>Ch. 6</td>
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<td>17</td>
<td>R Mar 11</td>
<td>B cell-med immunity</td>
<td>Ch. 9</td>
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<td></td>
<td></td>
<td>Spring Break</td>
<td>Mar 15-19—no class</td>
<td></td>
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<tr>
<td>10</td>
<td>18</td>
<td>T Mar 23</td>
<td>Review</td>
<td>Lec. 13-18</td>
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<tr>
<td></td>
<td>19</td>
<td>R Mar 25</td>
<td>Exam II</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>20</td>
<td>T Mar 30</td>
<td>Hypersensitivity I</td>
<td>Ch. 12; Ch. 15</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>R Apr 1</td>
<td>Hypersensitivity II</td>
<td>Ch. 12; Ch. 15</td>
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<tr>
<td>12</td>
<td>22</td>
<td>T Apr 6</td>
<td>Tolerance &amp; Autoimmun. I</td>
<td>Ch. 13; Ch. 16</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>R Apr 8</td>
<td>Tolerance &amp; Autoimmun. II</td>
<td>Ch. 13; Ch. 16</td>
</tr>
<tr>
<td>13</td>
<td>24</td>
<td>T Apr 13</td>
<td>Immune Resp. to Infectious Diseases</td>
<td>Ch. 10; Ch. 18</td>
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<tr>
<td></td>
<td>25</td>
<td>R Apr 15</td>
<td>Transplantation Immunity</td>
<td>Ch. 15; Ch. 17</td>
</tr>
<tr>
<td>14</td>
<td>26</td>
<td>T Apr 20</td>
<td>Exam III</td>
<td>Lec. 20-25</td>
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<tr>
<td></td>
<td>27</td>
<td>R Apr 22*</td>
<td>Vaccines</td>
<td>Ch. 14; Ch. 19</td>
</tr>
<tr>
<td>15</td>
<td>28</td>
<td>T Apr 27</td>
<td>Graduate Student Presentations I</td>
<td></td>
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<td></td>
<td>29</td>
<td>R Apr 29</td>
<td>Graduate Student Presentations II</td>
<td></td>
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<tr>
<td>16</td>
<td>30</td>
<td>T May 4</td>
<td>AIDS &amp; Immunodeficiencies</td>
<td>Ch. 11; Ch. 20</td>
</tr>
</tbody>
</table>

**Note:** Final Exam: R May 6 11 am-1:30 pm  
NOTE CHANGE OF TIME