IMMUNOLOGY
BIOL 465 (3 units); CRN 35826

COURSE SYLLABUS

Andrea Ferrante, M.D.
University of Alaska Fairbanks
Spring Semester 2013

Classes: Monday/Wednesday/Friday 10:30 – 11:30, Irving 103
Course Information
Immunology, BIOL 465 (3); CRN 35826
Meeting Times: Monday/Wednesday/Friday 10:30 – 11:30, Irving 103
Prerequisites: BIOL 115X; 116X and 310 or BIOL 111X and 112X; or permission of instructor.
Recommended: BIOL 362 (Genetics) and BIOL 342 (Microbiology) or co-enrollment.

Instructor
Andrea Ferrante, M.D., Assistant Professor of Immunology
Office: Arctic Health Research Building 2W04
Laboratory: Arctic Health Research Building 2W11
Phone: 474-5916 (office)
E-mail: aferrante@alaska.edu
Mailbox: Irving I Room 211
Office hours: Tuesday 2-4 pm or by appointment

Course Readings/Materials
Textbooks:

Suggested texts available:

Blackboard Page: Information from the lecture will be provided on UAF’s Blackboard system following the lecture as PowerPoint lecture slides, PDF lecture notes and possibly as podcast (audio only). These tools do not serve as a replacement for attendance at lecture. To log into it, go to https://classes.uaf.edu/webapps/login/ ad log in using your UAF ID and password. If you are using Blackboard for the first time, click on the first-time users for information. All course handouts will be posted here. Contact me by email if you are unable to access this site.

E-mail Notifications: On occasion, students will be contacted via email. I will assume that each student will check his or her university-assigned email address on a regular basis.

**Course Description and Goals**

1) **To acquire a level of knowledge and understanding of the basic principles and mechanisms of immunology:** The purpose of the Immunology course is to provide a basic knowledge of the immune response and involvement of immunity in health and disease. The course is designed as the first encounter with immunology for students that have taken introductory biology course. It will cover the fundamental facts and principles of immunology.

   The immune system is a highly complex and interactive system evolved to provide self-defense against pathogens. Immunology is the study of the biological basis and mechanisms that govern host defense against infection.

   By the time that the student has finished the course, he/she should have an understanding of the components of the immune system, he/she should be able to describe innate mechanisms of immune protection as well as explain how the diversity of immune response is generated. The student should be able to describe antigen recognition and processing for immune presentation, understand the basis for interaction of innate and adaptive immunity, he/she should know how to differentiate the functions of T and B cell subsets, and should be able to explain the molecular and cellular basis for generating an immune response that is specific and different for different infections. Finally, the student should have a clear understanding as to immune-mediated mechanisms may result in disease.

2) **To enhance your awareness of the impact of immunology on science and society:** The immune system plays a crucial role not only in fighting infectious pathogens, but also in other disease states, including cancer, as well as systemic and organ-specific autoimmune conditions, such as lupus, rheumatoid arthritis, scleroderma and diabetes. It is one of the most utilized systems for discovering the pathways/mechanisms that govern development in biological systems. The study of immunology has been both a source of important discoveries for many fields of biology, medicine, and public health, and a reservoir for the design/generation of exquisitely specific reagents that are of ever-increasing importance in diagnostics, research and therapeutics. The development of vaccines against common infectious diseases, which began in the nineteenth century, has substantially increased life expectancy, particularly in those regions of the world where vaccines are available. On the other hand, the emergence of human immunodeficiency virus and the resulting failure of the immune system in AIDS threaten to decimate populations, particularly in the developing world. Thus, immunology is a field of continuously expanding importance, scientifically, economically and socially. Research in immunology has led to the discovery of unique molecular processes, such as gene rearrangement and variation, for which many Nobel prizes have been awarded including those to Emil von Behring (recipient of the first Nobel Prize for Physiology or Medicine), Karl Landsteiner, Gerald Edelman, Cesar Milstein, Sosumu Tonegawa, Niels Jerne, Baruji Benacerraf, Jean Dausset, Rolf Zinkernagel, Peter Doherty, Ralph Staiman, Jules Hoffman and Bruce Beutler.

3) **To learn how to critically read and evaluate papers from the primary literature:** Approximately every week we will discuss classic and current papers in immunology, usually original research. Each student will be required to read the papers beforehand and participate in all discussions as well as act as discussion leader for one of the sessions.

4) **To improve writing and oral presentation skills:** During the course, the students will be pooled in “research” groups and will be invited to write a paper and to prepare a poster regarding a relevant topic in immunology. As the students will work on their projects, they will be introduced to several methods of data collection and data analysis routinely adopted in Immunology.
Policies

Grading
Grades will be based on the percentage of total points earned out of the total possible points based on the scale below. You will notice that the cut-off point for A- is not 90% but 88%. The comparable is true for the B-, C- and D- cutoffs. The reason for this is that under the plus/minus grade system, a C earns 2.0 in terms of GPA calculation. A C- earns only 1.7 on terms of GPA calculation, and does not count as successful completion of the course. **You must earn a C or higher for the course to count.** I think that if you have earned a 70% in this course, you have earned a C and 2.0 in terms of GPA credit, so I have set up the grading scale accordingly.

I will not grade on a curve individual exams.

Missed assignments and exams: times for assignments and exams will be designated well in advance. Completion of assignments and exams at the designated time will be the responsibility of the student. Accommodations will only be made for legitimate and documented contingencies. If you have a conflict with exam dates, please come talk to me at the beginning of the semester.

<table>
<thead>
<tr>
<th>Grade</th>
<th>% of Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97-100</td>
</tr>
<tr>
<td>A</td>
<td>90-96</td>
</tr>
<tr>
<td>A-</td>
<td>88-89</td>
</tr>
<tr>
<td>B+</td>
<td>86-87</td>
</tr>
<tr>
<td>B</td>
<td>80-85</td>
</tr>
<tr>
<td>B-</td>
<td>78-79</td>
</tr>
<tr>
<td>C+</td>
<td>76-77</td>
</tr>
<tr>
<td>C</td>
<td>70-75</td>
</tr>
<tr>
<td>C-</td>
<td>68-69</td>
</tr>
<tr>
<td>D+</td>
<td>66-67</td>
</tr>
<tr>
<td>D</td>
<td>60-65</td>
</tr>
<tr>
<td>D-</td>
<td>58-59</td>
</tr>
<tr>
<td>F</td>
<td>0-57</td>
</tr>
</tbody>
</table>

The point breakdown for this course is approximately as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture attendance/participation</td>
<td>80</td>
<td>8</td>
</tr>
<tr>
<td>Article discussion</td>
<td>80</td>
<td>8</td>
</tr>
<tr>
<td>Homework (6 at 15 pts./each)</td>
<td>90</td>
<td>9</td>
</tr>
<tr>
<td>One-hour test (4 at 75 pts./each)</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>Two-hour final written test</td>
<td>150</td>
<td>15</td>
</tr>
<tr>
<td>Group assignment</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Oral exam</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1000</td>
<td>100</td>
</tr>
</tbody>
</table>
Lectures
Active attendance of lecture is expected. Exams will be primarily based on material covered in lecture. Furthermore, announcements of upcoming exams, assignments, or any changes to the class schedule will be made at the beginning of class, and every student is responsible for that information. During some lectures, I will be doing educational activities that will count for points (research article discussion). I will make a subjective assessment of each student’s class participation, and assign a grade (8% of the final grade) during final evaluation. Tardiness, absenteeism, inattentiveness and unfamiliarity with course material will all negatively impact this subjective assessment. If you know that you will miss a lecture due to an excused absence (e.g. you are participating in a UAF sanctioned event, you become ill, you are participating in a military-required activity) you must inform me of the absence ahead of time in order for the points to be excused for that lecture. Of course these will not negatively impact the subjective assessment of class participation. The use of laptops, iPad/tablets and mobile/smart phones is not permitted during lecture; exceptions to this policy are granted solely at the discretion of the instructor.

Exams
You are expected to take all exams at the scheduled time. Check the exam schedule carefully and plan your appointments and travel around the course schedule. Exams will contain various types of questions, including multiple choice, matching, fill in the blank and short answer. The final exam (written and oral) will be cumulative.

- **Scheduled absences:** for absences caused by a conflict with a University-sanctioned activity (for example, participation in a competition with a UAF athlete), you must notify us in advance of the exam. You will be expected to take the exam before your absence. Other types of scheduled absences are generally not accepted: you are expected to schedule around exams. In particular, make sure that your schedule your flight home or vacation for after finals. I will not grant requests for early final exams.
- **Unscheduled (emergency) absences:** if an emergency arises the day of the exam that makes you unable to attend the exam, you must inform me before the start of the exam by e-mail or phone (leave a message if you cannot reach me). If the nature of the emergency makes it impossible for you to contact me in advance, contact me as soon as possible afterwards. You must a take-up exam within 48 hours of the scheduled exam. It is your responsibility to schedule the make-up. If not taken within 48 hours, the exam will be recorded as a zero. You should expect to provide documentation of emergency. Make-up exams are not guaranteed. They are granted at the instructor’s discretion.

Homework
Homework will be posted on Blackboard on Friday afternoon by 5 p.m. It is due the following Wednesday by 11:59 p.m. No late assignments will be accepted, as indicated in the following paragraph. The homework assignments will be designed to help you review important topics and to connect theoretical aspects of basic immunology to aspects of “real life” clinical immunology. Homework is open-note and open-book. I strongly encourage you to use the homework as study tool. Try to figure out the answer without looking at your book or notes. Then, before you submit your answer, check it yourself using your book, notes and the hints that are included in the assignment. Once you are confident it is correct, submit the answer. If you were incorrect, try to figure out why before you answer again. The work that you submit must be the product of your own understanding and be your own work.

Late work
Late work is not accepted. Any work turned in after due time will be recorded as a zero. Work will be collected at the beginning of the period in which is due. If you miss class on a day work is due, you must turn it in prior to the start of that class. Submitting work via e-mail is acceptable in
most cases, so long as the e-mail is sent prior to the start of class and contains all of the work that is due. Extensions on work are granted only under extenuating circumstances and must be obtained in advance from the instructor.

**Academic honesty**

Academic dishonesty will not be tolerated. You are expected to be familiar with the UAF Student Code of Conduct (available online in the UAF Catalog) and to follow it at all times. The use of any reference materials (notes, books, other people, etc.) or assistance of any type on exams is academic dishonesty. Obtaining an extension on work or delaying an exam through false pretenses is also academic dishonesty. Providing someone with the answer to homework assignments, taking answers from someone else on homework, doing homework for someone else, or allowing someone else to do your homework is academic dishonesty. Although you may work with a partner or partners depending on the nature of the project, your contribution to a collective assignment must be your individual work, clearly indicated and acknowledged by your peers. Any instances of these or any types of academic dishonesty will result in a grade zero on the work involved (this may include all the work in the category, for example, if the academic dishonesty involves a written exam, all the written exam scores may be changed to zeros), forwarding the incident to appropriate University personnel, and may result in an F in the course and/or expulsion from the University. If you are in doubt as to whether something constitutes academic dishonesty, ask your instructor.

**Plagiarism** is the overt or covert use of other people’s work or ideas without acknowledgement of the source. It is a type of academic dishonesty. Plagiarism includes using ideas or data from a classmate or colleague without permission and acknowledgment, including information from journal articles (either in their entirety or with minor changes) in your writing without citing the author, using sentences from published sources without quoting them, or copying parts of a website into your essay. **You cannot use someone’s ideas without citing the originator; you cannot use someone’s words without quoting the writer. Any deviation from this will be regarded as plagiarism.** When you plagiarize you are stealing the currency that science (and many other endeavors) uses: knowledge.

A few simple rules to prevent plagiarism:

1. When in doubt about whether you should cite or acknowledge someone, do so.
2. If you are unsure of how to cite someone’s writings or ideas, ask one of the instructors for help. Reference librarians are also a good source of information for help with citations.

**Disabilities**

All students, including those with disabilities, are welcome in this course, and I am committed to providing equal access to this course for all students. If you have a disability (including learning disabilities) please inform me during the first week of class so that I can accommodate your specific needs. If you have already done so, you will also need to contact UAF’s Office of Disabilities Services (474-7043). Everyone should have the opportunity to participate fully in the course and to complete assignments and exams to the best of their ability. If accommodations are needed to enable you to do so, I will gladly work with you to provide them.

**When you need help**

Immunology is a fascinating discipline, but as other disciplines describing complex systems, may not be of easy understanding. I will not know if you are having difficulties with the course material unless you tell me. I want to help you; my primary role in this course is to help you understand immunology. I would love to see everyone succeed in the course. Ultimately, however, how well you do in the class is not up to me; it is up to you. You have to gain the understanding for yourself. If there is anything I can do to help you with that, PLEASE ASK! If you have any questions or you are finding that you are struggling with a particular topic, assignment or question, there are several things you can do:
• If you have any question during lecture, ask! Don’t let me plow on ahead if you are lost.
• Talk to me after lecture or during office hours, or make an appointment to talk to me.
• Talk to a classmate. Setting up study groups can be very helpful.
• If it is a brief question, e-mail me.

Ask for help right away! I am happy to answer your questions and help you succeed.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F 01/18</td>
<td>Medical Importance of the Immune System</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>M 01/21</td>
<td>Cells and Organs of the Immune System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 01/23</td>
<td>Innate Immunity/Inflammation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 01/25</td>
<td>Immunogens &amp; Antigens</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M 01/28</td>
<td>Antibody Structure and Function I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 01/30</td>
<td>Antibody Structure and Function II</td>
<td>HW1 due</td>
</tr>
<tr>
<td></td>
<td>F 02/01</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>M 02/04</td>
<td>Exam 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 02/06</td>
<td>Complement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 02/08</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>M 02/11</td>
<td>Genetic Basis of Ab Structure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 02/13</td>
<td>Role of MHC in the Immune Response</td>
<td>HW2 due</td>
</tr>
<tr>
<td></td>
<td>F 02/15</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>M 02/18</td>
<td>The T Cell Receptor: Structure and Genetic Basis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 02/20</td>
<td>Adaptive Immune Response: Activation of T and B Cells</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 02/22</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>M 02/25</td>
<td>Cytotoxic Cell Mediated Immunity</td>
<td>HW3 due</td>
</tr>
<tr>
<td></td>
<td>W 02/27</td>
<td>Exam 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 03/01</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>M 03/04</td>
<td>Antigen-Antibody Interactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 03/06</td>
<td>Antibody-Mediated Reactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 03/08</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>M 03/18</td>
<td>Cell-Mediated Reactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 03/20</td>
<td>Immunology of HIV Infection</td>
<td>HW4 due</td>
</tr>
<tr>
<td></td>
<td>F 03/22</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>M 03/25</td>
<td>Infection and Immunity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 03/27</td>
<td>Immune Regulation &amp; Tolerance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 03/29</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>M 04/01</td>
<td>Exam 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 04/03</td>
<td>Cancer Immunology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 04/05</td>
<td>Journal Club</td>
<td>HW5 due</td>
</tr>
<tr>
<td>12</td>
<td>M 04/08</td>
<td>Autoimmunity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 04/10</td>
<td>Transplantation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 04/12</td>
<td>Journal Club</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>M 04/15</td>
<td>Disorders of the Immune Response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 04/17</td>
<td>Immunoprophylaxis (Vaccines) &amp; Immunotherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 04/19</td>
<td>Journal Club</td>
<td>HW6 due</td>
</tr>
<tr>
<td>14</td>
<td>M 04/22</td>
<td>System Immunology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 04/24</td>
<td>Exam 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 04/26</td>
<td>SpringFest – no classes</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>M 04/29</td>
<td>Poster presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W 05/01</td>
<td>Final Exam (Written)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F 05/03 and M 05/06</td>
<td>NO CLASS</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>W 05/08</td>
<td>Final Exam (Oral)</td>
<td></td>
</tr>
</tbody>
</table>