

**Department of Biological Sciences  
BIO 401, Immunology  
Fall Semester 2012**

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**Phone:** 523-0042  
**Office Hours:** **11:30 – 12:30 PM** Monday, Wednesday and Friday or by appointment.  
You will need to call my office from the first floor in the Wettaw building so  
that I can come down and open the door for you.  
**Webpage:** **<http://www2.nau.edu/~fpm/>**

**Course Prerequisites:** BIO 375, CHM 230 and 230L or CHM 235 and 238. Recommended CHM 360 (Biochemistry). Students who have not met the prerequisites will be administratively dropped.

**Course Description:** This course includes a detailed description of the immune response made in humans to foreign antigens including microbial pathogens. A description of cells involved in the immune response either innate or acquired. How the immune system recognizes self from non-self. B and T cell maturation and specific responses. Other topics covered will include the genetic basis of diversity of immune responses in mammals.

**Required textbook:** *Immunobiology*, 6<sup>th</sup> edition by Janis Kuby. This is a new edition but the 5<sup>th</sup> edition will still work.

**Lecture Meets:** Mon-Wed-Fri from **10:20 to 11:10 AM** in Room 256, Building 21.

**Credit Hours:** 4 credits total (3 credits for lecture which meets for 50 min, 3 times a week and 1 credit for the laboratory which meets for 2 hours and 50 minutes once a week.

**Course Objectives: Upon successful completion students will -**

- 1) To promote critical thinking among students; 2) to provide students with a foundation in immunological processes; 3) to provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology; 4) be able to clearly state the role of the immune system; 5) be able to compare and contrast the innate versus adaptive immune systems; 6) be able to articulate the roles of innate recognition receptors (i.e. Toll-Like Receptors) in immune responses; 7) be able to compare and contrast humoral versus cell-mediated immune responses; 8) be able to distinguish various cell types involved in immune responses and associated functions; 9) be able to distinguish and characterize CD4<sup>+</sup> T helper cell lineages Th1, Th2, Th17, and regulatory T cell (Treg); 10) be able to distinguish and characterize antibody isotypes, development, and functions; 11) understand the role of cytokines in immunity and immune cell activation; and be able to identify and characterize cytokines of particular immune importance; 12) understand the significance the Major Histocompatibility Complex in terms of immune response and transplantation; 13) be able to describe lymphocyte development and the expression of their receptors; and 14) be able to provide an overview of the interaction between the immune system and pathogens.

**Expectations of the Students:**

- 1) Although there is a significant memorization component to this course, students will be tested on their problem solving abilities and critical thinking. Consequently students who simply memorize material in preparation for the examinations score much lower than

students who actually understand the material and can apply what they know to problems that they have not seen before.

- 2) Students are expected **to behave professionally at all times**. For each hour you spend in lecture you will be expected to spend at least two hours in study and preparation outside the class. You will also spend time outside the laboratory writing lab reports, studying for quizzes, preparing for upcoming labs, etc.
- 3) Regular attendance is critical for success. It is recognized that absence from class is sometimes necessary. However, **each student is accountable** for all work missed due to any absence. The instructor is under no obligation to make special arrangements for students who have been absent.
- 4) Students are expected **to be on time** and leave the classroom when the instructor indicates the class is over. After the first week students coming late (after class has already started) will have **to use the "back door"** to prevent any interruption in the lecture.
- 5) Following exams the instructor will return graded exams **within one week**. If students come to ask about the exam or for their grade prior to returning or posting of grades they will be **penalized five points**.
- 6) No **cell phones** will be allowed in this class. You are welcome to switch your phone to vibrating mode. If your telephone rings off during class **you will be asked to leave the classroom**.
- 7) Students are expected to read the Chapter in the book corresponding to lecture **PRIOR** to the lecture. Students will at random be asked to participate in discussions pertaining to prior readings or lectures.

**Strategies for Success:** (these suggestions have helped students to be successful in the past):

- 1) Record the lecture on tape and then play it back while reviewing your lectures notes. This will also help you if you have problems with the Aussie-Tex-Mex accent of the instructor. Note that many students like to "re-write" their lecture notes. This is a singularly unproductive study method for many students. It is much more efficient to edit the notes you already have (even if they are a bit messy) while listening to the tape.
- 2) Form small study groups. Immunology is a difficult subject, so forming small study groups early in the semester and getting together at least once a week to review that week's material is very helpful. If you can explain the material to someone else = you know it!!
- 3) Learn the material as you go along rather than trying to learn it just before the exam. There are three lectures of 50 minutes each every week. The material really accumulates quickly.
- 4) If you have trouble getting to office hours, take advantage of the Learning Assistance Center (LAC) for questions about this topic, as well as for help on how to improve your study.

**Grading:** Your final grade is a combination of the course plus the laboratory. Your grade will be 75% from lecture and 25% from the laboratory. The lecture contains 3 semi-cumulative exams worth 100 points and a cumulative final worth 150 points. In class quizzes are worth 50 points, bringing the total to 500 points. The laboratory counts 25% (with a total of 300 points). To determine your final grade in the lab multiply the total number of points you earned in the lab by 0.084. Example, 250 points out of 300, now  $250 \times 0.084 = 21$  points from the lab towards your final grade.

Three one hour exams	Exam 1	100	Sept 21
	Exam 2	100	Oct 17
	Exam 3	100	Nov 14
	Final Exam	150	Dec 10
	Quizzes	<u>50</u>	<b>Every Friday</b>
		<b>500 points total</b>	

This will count for 75% of your final grade. Laboratory grade (quizzes, exams, etc, totaling 300 points). This will count for 25% of your final grade

**Cumulative Exams:** All exams are cumulative to some degree. This approach has four purposes: 1) it prevents the student from studying a block of material for an examination, taking the exam, and then forgetting the material, 2) it facilitates retention of basic concepts that you will be using in future courses, 3) it provides an opportunity for learning a concept that was not learned or not understood during the first presentation, and 4) reduces the tendency for students to decrease their grade in the course due to poor performance on the final exam. The final exam for this course will be on Monday **December 10th**, and many students are ill prepared to take cumulative final exam.

**Exam Questions:** This is a 400 level and capstone course so, exams will contain essay questions, short answers, problem solving, matching questions, take home questions, and multiple choice. The best questions are those in which you need to describe and illustrate specific immune processes. Exam questions will be drawn mainly from lecture material but will also come from the textbook or outside reading assignments. **Note:** Starting with the second exam there will be 5 questions coming from the previous exam.

**Exam Questions Challenge:** Students have the right to challenge a question on the exam. However, the **following rules** must be followed:

1. Challenges must be made **within 7 days** after the examination is returned to the class.
2. Challenges must be **in writing** using text page number(s) to justify your challenge and clipped to your exam.
3. Challenges (and exams) are to be placed in my mailbox next to the Biology office or delivered them to me during class. I will evaluate your test and return it to you with my response. I reserve the right to **re-grade** your entire test.

**Quizzes:** Quizzes will be given every Friday over material covered in the previous two lectures. There will be 12 quizzes but **ONLY** the top 10 quizzes will make up your quiz grade. You must attend class to take the quiz. No quizzes will be made up or rescheduled as you are allowed to drop two.

**Examination Make-up:** Unless you have made previous arrangements or you are in a unique circumstance. **No make up exams** will be offered. **No exceptions**. According to University regulations the following excuses are acceptable: attendance at a University authorized activity (signed form needed), illness (written excuse from Doctor), death in the immediate family (documentation from the Dean of students), or legal proceedings requiring the student's presence (documentation). \*Remember an excuse from a Doctor's appointment is not valid unless it was necessary to see the Doctor during class time and you are deemed infectious or too sick to attend class.

**Curving Exams:** There are **NO** curves in this class.

**Grading Policy:**

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 60-69%
- F = below 60%

**Study guides:** All lecture exams will be preceded by a detailed study guide for students to use in preparation for their exam. The instructor reserves the right not to offer these study guides if students are not putting their effort in answering them.

**Professional Conduct:** Academic dishonesty (cheating or plagiarism) will result either in an F for that exam or an F for the entire course. Please note that we consider cheating and plagiarism as being equally unprofessional. **Plagiarism** is using, even with citation, eight or more words in a row directly from a source. Plagiarism is plagiarism, whether it is from an electronic or a print source. Faculty are pretty good at recognizing it, there are programs available to check student work against web documents and against each other, your class mates may turn you in, and you will suffer consequences if caught - **so don't plagiarize!!**

**Note:** The insurance policies carried by the university do not provide for medical coverage for students while participating in university related activities. Students are strongly encouraged to obtain their own medical/health insurance either through coverage using their parent's insurance plans or purchasing their own insurance through the Fronske Health Center.

**Tentative Lecture Schedule:** No set timetable will exist to cover material. Although, the amount of material covered for each exam may vary from that in the lecture schedule, the EXAMS DATES ARE WRITTEN ON STONE. **It is unlikely** that we will have time to cover all of the material listed below.

### BIO401 - FALL 2012 SYLLABUS

DATE	TOPIC	CHAPTER
<b>Aug. 27</b>	Overview of the Immune System	Chapter 1
Aug.	Overview of the Immune System	Chapter 1
Aug.	Cells and Organs of the Immune System	Chapter 2
Aug.	Cells and Organs of the Immune System	Chapter 2
Sept.	Innate Immunity	Chapter 3
Sept.	Innate Immunity	Chapter 3
Sept.	Antigens and Immunogens	Chapter 4
Sept.	Antigens and Immunogens	Chapter 4
Sept.	Antigen-Antibody Interactions: Principles and Applications	Chapter 6
<b>Sept. 21</b>	<b>Exam 1</b>	
Sept.	Antigen-Antibody Interactions: Principles and Applications	Chapter 6
Sept.	Complement System	Chapter 7
Sept.	Complement System	Chapter 7
Sept.	Major Histocompatibility Complex (MHC)	Chapter 8
Oct.	Major Histocompatibility Complex (MHC)	Chapter 8
Sept.	Organization and Expression of Immunoglobulin Genes	Chapter 5
Sept.	Organization and Expression of Immunoglobulin Genes	Chapter 5
Oct.	T-cell receptor gene organization	Chapter 9
Oct.	T-cell receptor gene organization	Chapter 9
<b>Oct. 17</b>	<b>Exam 2</b>	
Oct.	T-cell receptor gene organization	Chapter 9
Oct.	T-cell Activation, Differentiation and Maturation	Chapter 10
Oct.	T-cell Activation, Differentiation and Maturation	Chapter 10
Oct.	T-cell Activation, Differentiation and Maturation	Chapter 10
Oct.	B-cell Generation, Activation, and Differentiation	Chapter 11
Oct.	B-cell Generation, Activation, and Differentiation	Chapter 11
Oct.	B-cell Generation, Activation, and Differentiation	Chapter 11

Oct.	Cytokines and Their Receptors	Chapter 12
Oct.	Cytokines and Their Receptors	Chapter 12
<b>Nov. 14</b>	<b>Exam 3</b>	
Nov.	Cytokines and Their Receptors	Chapter 12
Nov.	Leukocyte Activation and Migration	Chapter 13
Nov.	Leukocyte Activation and Migration	Chapter 13
Nov.	Leukocyte Activation and Migration	Chapter 13
Nov.	Cell-Mediated Cytotoxic Responses	Chapter 14
Nov.	Cell-Mediated Cytotoxic Responses	Chapter 14
Nov.	Hypersensitivity Reactions	Chapter 15
Nov.	Hypersensitivity Reactions	Chapter 15
Nov. 22-23	<b>Thanksgiving break</b>	
Nov.	Hypersensitivity Reactions	Chapter 15
Dec.	Immune Responses to Infectious Agents	Chapter 18
<b>Dec. 9</b>	Last day of classes	Chapter 18
<b>Dec. 10</b>	<b>Final Exam</b>	10:00-12:00PM