

## *Immunology*

Biology 653 – Spring 2016  
Class Meetings: Mondays and Wednesdays  
Meeting Time: 01:00–2:15 PM

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### **COURSE DESCRIPTION**

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The immune system of vertebrates is an integrated network of organs, cells, molecules, and pathways that is primarily responsible for recognizing and destroying pathogens. It is amazing in its ability to react to any type of foreign substance antigens, whether that is a specific molecular tag on the surface of a microbe or a completely synthetic structure never before seen in nature. Although we have advanced far in our understanding of how the immune system responds to microbial invaders, we still have much to learn concerning its role in the prevention and progression of chronic diseases such as heart disease, cancer, and diabetes.

This course is a survey of the vertebrate immune system with a focus on the molecular, genetic, and cellular basis of immunity using mouse models and human systems. We will also investigate what happens to an organism when the immune system breaks down or becomes overactive.

#### **Course Format:**

Biol 653 is a 3-credit course comprised of advanced undergraduates and graduate students. The class meets twice a week in the form of two 75-minute lectures. Where appropriate, formal lectures will be mixed with classroom discussions of current literature to enhance learning.

#### **Course Objectives:**

Biol 653 is intended for biology majors interested in learning about the basic cell and molecular biology that underlies the immune system. The undergraduate part of the course will be supplemented with graduate-level presentations and discussions of the current scientific literature.

#### **Learning Outcomes:**

Students who successfully complete this course will acquire a basic understanding in the following areas related to the immune system. This background will allow them to access and critically evaluate the current scientific literature on the subject.

- Cells, organs, and microenvironments of the immune system
- Experimental systems for studying the immune system
- Fundamental differences between innate and acquired immunity
- B cell development, function, and receptor expression
- T cell development, function, and receptor expression
- Cytokine and chemokine signaling

- The complement system
- The cell and molecular basis of self tolerance
- The cell and molecular basis of immune memory
- The major histocompatibility complex and the molecular recognition of “self “molecules
- The development and use of vaccines for the prevention of microbial infections
- Immune dysfunctions related to allergy, hypersensitivity, and chronic inflammation
- Immune dysfunctions related to immunodeficiency and autoimmunity
- Immune dysfunctions related to cancer

In addition, graduate students enrolled in the class will learn how to read and critically evaluate the current scientific literature, as well as how to prepare and present lectures to undergraduate students on this technical material.

**Prerequisites:**

Graduate-level standing OR permission of the instructor is required.

**Class Materials:**

- 1) Required Textbook: Kuby Immunology (7<sup>th</sup> ed), by Owen, Punt, and Stranford.
- 2) Suggested supplement for those new to the field: How the Immune System Works (5<sup>th</sup> ed), by Sompayrac.
- 3) Access to a network computer for accessing Webcampus.

**Class Postings on WebCampus:**

WebCampus will be used in this course to list the syllabus, announcements, and class notes. It will also be used to report grades and for e-mail correspondence between students and the instructor. Class lectures will be posted 12 hours prior to each meeting, and students will be expected to use these resources and supplement them with their own comprehensive notes. A WebCampus page has been created for this course. Login instructions are available at (<http://webcampus.nevada.edu>). In addition to providing notes, WebCampus provides a confidential means of communicating with the instructor and for viewing grades. Please note that the instructor will not accept e-mails from students not using the WebCampus system. Using WebCampus ensures that a student's e-mail is not blocked by spam or lost in other mailboxes or servers. Students who are having problems using WebCampus should call the Student Computing Support Center (895-0761).

**Electronic Correspondence:**

By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @[unlv.nevada.edu](http://unlv.nevada.edu). **Emailing within WebCampus is acceptable.** The instructor is not obligated to read and respond to electronic messages from students using non-university accounts. Communication by e-mail should be through Webcampus or by Rebelmail only if Webcampus is unavailable.

## STUDENT ASSESSMENT

### Grading:

Final grades are based on the combined numerical scores from four exams, a lecture prepared by the graduate student, and a paper discussion led by the graduate student. To evaluate a performance as the semester progresses, the following cutoffs can be used: 93-100% = A; 90-92% = A minus; 87-89% = B plus; 83-86% = B; 80-82% = B minus; 77-79% = C plus; 73-76% = C; 70-72% = C minus; 67-69% = D plus; 63-66% = D; 60-62% = D minus; 59% and below = F. **Students should NOT expect final grades to differ from these cutoffs, and thus it is unlikely that there will be a significant “curve” applied to these grade distributions.** Grade scores for each student assessment will be posted on Webcampus, usually within one week of the test date. Only students presenting the proper login credentials will have access to this information from this secure website.

**Remember the early drop deadline (for full refund) is August 28, 2015.**

**Late drop deadline (with no refund) is October 30, 2015.**

### Grade Distribution:

Exam 1 = 100 points (~16.7%)
Exam 2 = 100 points (~16.7%)
Exam 3 = 100 points (~16.7%)
Exam 4 = 100 points (~16.7%)
Powerpoint Lecture = 100 points (~16.7%)
<u>Research Paper Discussion = 100 (~16.7%)</u>
<b>TOTAL = 600 points (100%)</b>

### Exams:

All exams for Biol 653 will be administered for 2 hours and consist of 33 short-answer questions. The dates and times for exams 1, 2, and 3 will occur outside of regular class time to accommodate the longer format. Exam 4 will follow the same format, but it will be administered during Final Exam week on May 9. Thus, each of the four exams will constitute 16.7% of the total class grade. The exam material will be derived from the lecture notes, textbook readings, and research paper readings. The final exam is not comprehensive per se, but students are advised that each exam will build off the previous material and this effectively makes each exam comprehensive. **ALL STUDENTS MUST TAKE THE MIDTERMS ON THEIR SCHEDULED DATE AND TIME.** Only those students presenting official documentation for an excused absence (see below) will be allowed to take the exam at a different date and time. If a student misses the exam without the documentation for an official excuse, he/she will receive a zero for that exam.

### Powerpoint Presentations and Research Paper Discussions:

Each graduate student is required to prepare and deliver one 75-minute Powerpoint lecture to the class as a whole, and to follow that lecture with a 75-minute research paper discussion on the next class meeting. Together these presentations will comprise 33.4% of the total class grade. Students will choose **OR** be assigned a specific topic from a list generated by the instructor. In addition, the class as a whole will be required to evaluate each presentation and generate feedback for the speaker.

### Class Attendance, Discussion, and Participation:

Class attendance and discussion of the lecture material is strongly advised as there is a good correlation between those students who attend the lectures and those who receive a grade of an A or B. As an added incentive, there MAY be extra credit points awarded for attending lectures. Typically this might result in 1-10 points (not percentage points) added to the final 600-point grade. These extra credit points are designed to help boost students from the bottom of a grade cutoff into the next highest grade.

### **Excused Absences:**

Attendance for each exam and presentation is required, and an unexcused absence will result in a **ZERO** for that exam or presentation. Only four scenarios typically qualify as excused absences:

1). The exam falls on a University sanctioned religious holiday and if the student can provide written documentation from a religious authority such as a priest, rabbi, or minister PRIOR to the exam.

2). A student must miss an exam to attend a University sponsored activity such as a sporting meet or academic competition. In this case the student must provide written documentation from the athletic director, coach, or faculty advisor before the exam.

3). A student misses an exam due to a medical or legal emergency in which a student had to seek medical help or attend a court-mandated hearing. In this case the student must provide the written documentation within **ONE WEEK** of the missed exam and the excuse from a physician or court clerk must list the date and time of the emergency visit, office visit, or court hearing.

4). A student must miss an exam because of an interview for professional school or to attend a scientific conference in which he/she is presenting. In this case the student must provide written documentation one week before the scheduled exam.

No other excuses will be accepted and if a student misses an exam without an accepted excuse, he/she will receive a **ZERO** for that exam.

### **Incomplete grades:**

The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade. **Incompletes cannot be used to "rescue" a failing performance in the course.**

## **OTHER IMPORTANT INFORMATION**

### **Classroom Conduct:**

The University requires that all students behave in class and in libraries in ways that do not interfere with the right of other students to learn or of instructors to teach. Behaviors such as

talking or watching videos during lecture, late and/or disruptive arrival, early and/or disruptive departure, having a cell phone ring, texting, surfing the web, or any other actions that compromise the classroom learning environment is extremely rude. **The instructor maintains a zero-tolerance policy on these activities and will single the student out if they occur!** First-time offenders may be embarrassed, but serial offenders face stiffer consequences, which may include administrative ejection from the course. Students should be aware that they are not anonymous in this class and that bad behavior will be dealt with as such.

It is important to remember that the instructor wants the students to do well in this class. A student should visit office hours or make office appointments if he/she is having trouble comprehending the course material or studying for the exam or assignments. These problems, if corrected early, can often help the student avoid receiving a grade that does not reflect his/her efforts and expectations for the class.

**Because this class encompasses so much material, it is important that it starts promptly at 1:00 PM, and students should make every effort to come to class on time. If a student MUST be late, please be considerate of classmates when entering the room after instruction has begun.**

### **Disability Assistance:**

The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

### **Tutoring and Coaching:**

The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

### **UNLV Writing Center:**

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

### **Academic Misconduct:**

Academic integrity is a legitimate concern for every member of the campus community;

all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

**All exams and assignments are to be done individually. Evidence to the contrary will be deemed as academic misconduct. The instructor maintains a zero-tolerance policy on academic dishonesty, which is a very serious offense that can result in expulsion from the course, a grade of "F" for the entire course, and other possible disciplinary actions. Any student caught cheating in an assigned exercise will receive a grade of ZERO for that assignment and an academic misconduct report will be filed with the Office of Student Conduct for inclusion as part of the student's permanent academic record.**

#### **Copyright:**

The University requires all members of the University Community to familiarize themselves **with** and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

#### **Sexual Harassment:**

It is the policy of UNLV to maintain the University Community as a place of work and study for staff, faculty, and students free of sexual harassment and all forms of sexual intimidation and exploitation. The determination of what constitutes sexual harassment will vary with the particular circumstances, but it may be described generally as repeated and unwanted sexual behavior, such as physical contact and verbal comments or suggestions that adversely affect the working or learning environment. Anyone who is subjected to offensive sexual behavior is encouraged to pursue the matter through the Office of Diversity Initiatives (Tel. 895-3891). Contacts are confidential.

#### **Dangerous Weapons:**

Dangerous weapons are not permitted on campus without the express written approval of the Director of the Office of Public Safety. This policy applies to all persons on the UNLV campus, except law enforcement officers in pursuit of their duties. Facsimile weapons are also banned.

#### **Religious Holidays Policy:**

Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course

for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Transparency in Learning and Teaching:**

The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

**Library Resources:**

Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

**Final Examinations:**

The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at:

<http://www.unlv.edu/registrar/calendars>.

**BIOL 653 COURSE CONTENT AND MEETING TIMES - SPRING 2016**

Class Meetings: Mondays and Wednesdays, 1:00-2:15 AM  
Text: Kuby Immunology (7ed, 2013) by Owen, Punt, Stranford

Meeting Date		Class and Topic	Text Readings Chapter(s): Pages
Mon	Jan 18	<b>Martin Luther King Holiday: NO CLASS</b>	
Wed	Jan 20	1.1: Overview of the Immune System	1: 1-25
Mon	Jan 25	1.2: Immune System Cells, Organs, and Microenvironments	2: 27-63
Wed	Jan 27	1.3: B and T Receptors and Signaling	3: 65-103
Mon	Feb 01	1.4: Cytokine and Chemokine Signaling	4: 105-140
Wed	Feb 03	1.5: Innate Immunity	5: 141-185
Mon	Feb 08	1.6: Complement System	6: 187-223
Wed	Feb 10	1.7: Lymphocyte Receptor Genes	7: 225-259
Mon	Feb 15	<b>Presidents' Day Holiday: NO CLASS</b>	
Wed	Feb 17	<b>EXAM 1 (Covers 1.1 through 1.7)</b>	
Mon	Feb 22	2.1: Major Histocompatibility Complex	8: 261-298
Wed	Feb 24	2.2: T-Cell Development	9: 299-328
Mon	Feb 29	2.3: B-Cell Development	10: 329-356
Wed	Mar 02	2.4: T-Cell Activation, Differentiation, and Memory	11: 357-384
Mon	Mar 07	2.5: B-Cell Activation, Differentiation, and Memory	12: 385-414
Wed	Mar 09	2.6: Cell and Antibody Mediated Immunity	13: 415-450
Mon	Mar 14	<b>EXAM 2 (Covers 2.1 through 2.6)</b>	
Wed	Mar 16	3.1: The Immune Response in Space and Time	14: 451-484
Mon	Mar 21	<b>Spring Break: NO CLASS</b>	
Wed	Mar 23	<b>Spring Break: NO CLASS</b>	
Mon	Mar 28	3.2: Experimental Systems to Study Immunology	20: 653-692
Wed	<b>r 30</b>	3.3: Allergy, Hypersensitivities, and Chronic Inflammation	15: 485-516
Mon	<b>r 04</b>	3.4: Current Research on Allergy, Hypersensitivity, Inflammation	Paper
Wed	Apr 06	3.5: Tolerance, Autoimmunity, and Transplantation	16: 517-552
Mon	Apr 11	3.6: Current Research on Tolerance, Autoimmunity, etc	Paper
Wed	Apr 13	4.1: Infectious Diseases and Vaccines	17: 553-591
Mon	Apr 18	<b>Exam 3 (Covers 3.1 through 3.6)</b>	
Wed	Apr 20	4.2 Current Research on Infectious Diseases and Vaccines	Paper
Mon	Apr 25	4.3: Immunodeficiency Disorders	18: 593-626
Wed	Apr 27	4.4: Current Research on Immunodeficiency Disorders	Paper
Mon	May 02	<b>Cancer and the Immune System</b>	19: 627-651
Wed	May 04	4.6: Current Research on Cancer and the Immune System	Paper
<b>MON</b>	<b>May 09</b>	<b>Final meets from 1:00 PM to 3:00 PM in CBC-A112 FINAL EXAM, (Covers 4.1 through 4.6)</b>	