

## BIOL 4550 / BIOL 6550: Immunology (Summer, 2021)

### 1. Course Information

- Course number and section: BIOL 4550 (CRN #: 52883), BIOL 6550 (CRN #: 52916)
- Course name: Immunology
- Hours of credit: 4
- Pre-requisites or co-requisites as listed in university catalogue: (BIOL 4550) (BIOL 1107K Minimum Grade: C or BIOL 2XM1 Minimum Grade: C and BIOL 2XML1 Minimum Grade: C) and (BIOL 1108K Minimum Grade: C or BIOL 2XM2 Minimum Grade: C and BIOL 2XML2 Minimum Grade: C) and BIOL 3100 Minimum Grade: C; (BIOL 6550) Admission into the graduate program or permission of the instructor.
- Classroom location and room number:  
Lecture: M-R 12:45 pm – 2:10 pm, BC 2202  
Lab: MW 2:30 pm – 5:20 pm, BC 3018
- Department, College, University: Department of Biology, College of Arts and Sciences, Valdosta State University

### 2. Instructor Information

- Instructor name: Dr. Jonghoon Kang
- Instructor contact: BC 2217, 229-333-7140, jkang@valdosta.edu
- Instructor office hours: TR 2:30 pm – 3:30 pm

### 3. Course Description

- Introduction to basic concepts of immunology, including antigen and antibody structure, the generation of diversity, the nature of T cell and B cell receptors, cellular cooperation, and the down regulation of immune responses.
- Required texts, resources, and materials: “Basic Immunology” by Abbas et al. from Elsevier; 6th edition
- Required out-of-class activities: Reading lecture notes, presentation materials, and the textbook. Performing any assigned projects.

### 4. Standards, Goals, Objectives, or Outcomes

- outcomes:

The General Education Outcomes (<https://www.valdosta.edu/academics/general-education-council/ge-outcomes.php>).

AREA A2: Students will demonstrate mathematical proficiency by analyzing a variety of functions and solving various equations.

AREA D: Students will demonstrate understanding of the physical universe and the nature of science, and they will use scientific methods and/or mathematical reasoning and concepts to solve problems.

The departmental educational outcomes (listed in the university catalogue).

1. Develop and test hypotheses, collect and analyze data, and present the results and conclusions in both written and oral formats used in peer-reviewed journals and at scientific meetings.
3. Demonstrate an understanding of the cellular basis of life.
4. Relate the structure and the function of DNA/RNA to the development of form and function of the organism and to heredity.

- Course objectives or outcomes:
  - Describe basic terminology in immunology.
  - Describe the underlying physical and chemical principles in immunology.
  - Demonstrate an understanding of basic computational techniques in immunology.
  - Demonstrate literature analysis capability. Graduate students need to select papers to present in consultation with the instructor.
  - Interpret clinical cases using basic principles of immunology.
  - Demonstrate competency for the immunology part in standard tests such as MFT, GRE, MCAT, and DAT.
  - Perform research to publish (optional)

5. Assignments (explicitly aligned with the goals, objectives, or outcomes)

- General description of the assignments: Students are required to read the textbook to be covered before and after class. Some additional materials will be posted on Blazeview and you need to study them before class. There will be three in-class tests, one lab test, and one final test.
- Policies for missed assignments, make-up assignments, late assignments, and/or extra credit: If you miss any assignment due to medical or family-related emergency you can have make-up assignments as long as you prove the valid reason of your absence (doctor's notes). **Otherwise no make-up tests or labs!** And you will get a zero point for the missing part. Late assignments will not be accepted. If you miss the lab more than three times for any reasons, you won't pass this course. So, make sure that you attend all lectures as well as labs.

6. Assessment or Evaluation Policy

- Explanation of how much each assignment contributes to the overall grade for the class:

**Total Score (U) = 300 (In Class Exam) + 100 (Lab Practical) + 200 (Final) = 600**

**Total Score (G) = 300 (In Class Exam) + 100 (Lab Practical) + 100 (Term Paper) + 200 (Final) = 700**

- Explanation of how grades are assigned:

Total score (%)	Grade
>= 90%	A
>= 80%	B
>= 60%	C
>= 40%	D
< 40%	F

7. Schedule of Activities or Assignments, including university -scheduled final exam time (all schedule is tentative and may be subject to change)

Date	Class	Date	Lab
6/9 – 6/10	1 Introduction to the Immune System	6/9	Introduction and Overview
6/14 – 6/17	2 Innate Immunity 3 Antigen Capture and Presentation to Lymphocytes	6/14	Documentary (Ballroom B & C (3rd Floor))
		6/16	Mathematica, ImageJ, and Trends in Immunology (Ref 1)
6/21 – 6/25	4 Antigen Recognition in the Adaptive Immune System <b>EXAM 1 (100 points)</b>	6/21	Cancer Immunology by Math Example of Computational Biology
		6/23	Systems of Equations Calculus
6/28 – 7/1	5 T Cell–Mediated Immunity 6 Effector Mechanisms of T Cell–Mediated Immunity	6/28	Thermodynamic characterization of dissociation rate variations of human leukocyte antigen and peptide complexes (Ref 2)
		6/30	Protein Bioinformatics for Immunology: UniProtKB (Ref 3 and 4) Basic Statistics Introduction to Diffusion (Einstein theory) Biophysics and Bioinformatics of Cytokines
7/5 – 7/8	7 Humoral Immune Responses 8 Effector Mechanisms of Humoral Immunity	7/7	Thermodynamic Analysis of the Interaction between the O.5β Fv Fragment and the RP135 Peptide Antigen Derived from the V3 Loop of HIV-1 gp120 (Ref 5) Structural characteristics correlate with immune responses induced by HIV envelope glycoprotein vaccines (Ref 6)
7/12 – 7/15	<b>EXAM 2 (100 points)</b> 9 Immunological Tolerance and Autoimmunity	7/12	The dimer-monomer equilibrium of SARS-CoV-2 main protease is affected by small molecule inhibitors (Ref 7)
		7/14	Computational Epitope Prediction (Ref 8 – 10)
7/19 – 7/22	10 Immune Responses Against Tumors and Transplants 11 Hypersensitivity <b>EXAM 3 (100 points)</b>	7/19	Yellow fever virus epitope – Thermodynamics (Ref 11)
		7/21	PCA in Immunology (Ref 12)
7/26 – 7/27	12 Congenital and Acquired Immunodeficiencies	7/26	<b>Lab Practical I (100 points)</b>
7/28	<b>Open-Notebook Final Exam (12:45 - 2:45pm) (200 points) at 2202</b>		

E1	E2	E3	LP	Final	Total
100	100	100	100	200	600

Mid-Term: July 1

Independence Day Holiday: July 5

References:

1. <https://www.wolfram.com/wolfram-u/catalog/gen005/>
2. <https://pubmed.ncbi.nlm.nih.gov/19564042/>
3. <https://www.ncbi.nlm.nih.gov/books/NBK6294/>
4. <https://www.immport.org/resources/cytokineRegistry>
5. <https://www.sciencedirect.com/science/article/pii/S0021925819887677?via%3Dihub>

6. <https://www.sciencedirect.com/science/article/pii/S004268220600290X>
7. <https://www.nature.com/articles/s41598-021-88630-9#Tab1>
8. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5763123/>
9. <http://www.cbs.dtu.dk/services/NetMHCpan/>
10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7738742/>
11. <https://www.sciencedirect.com/science/article/pii/S016158902030403X?via%3Dihub>
12. <https://pubmed.ncbi.nlm.nih.gov/21674720/>

## 8. Classroom Policies

- Attendance and tardiness: Any absence policy should conform to the university policy. University Attendance Policy from the VSU catalogue:  
“The University expects that all students shall regularly attend all scheduled class meetings held for instruction or examination. When students are to be absent from class, they should immediately contact the instructor. **A student who misses more than 20% of the scheduled classes of a course will be subject to receive a failing grade in the course.**”
- Lab Conduct: Arrive on time. Students who miss two labs without an excuse or three labs total cannot receive a lab grade above a “D” (60%). So, do not be late to lab. In the event that a student misses a lab with an excuse, s/he should email the instructor within 24 hours of the missed lab. It is the instructor’s prerogative to accept the excuse or not. Absolutely no laboratories can be made up, and no work will be accepted late.
- Accommodations Statement:  
From VSU’s Access Office (<http://www.valdosta.edu/access/facresources.shtml>):  
“Students requesting classroom accommodations or modifications due to a documented disability must contact the Access Office for Students with Disabilities located in Farber Hall. The phone numbers are 245-2498 (V/VP) and 219-1348 (TTY).”
- Academic Integrity: You know that cheating is a bad thing to do. Students caught cheating will receive a grade of F for the test in question and will be reported to the Dean of Students. You are expected to follow VSU’s Academic Integrity Code.  
From VSU’s Academic Integrity Code (the full code is available at <http://www.valdosta.edu/academic/AcademicHonestyPoliciesandProcedures.shtml> :  
“Academic integrity is the responsibility of all VSU faculty and students. Faculty members should promote academic integrity by including clear instruction on the components of academic integrity and clearly defining the penalties for cheating and plagiarism in their course syllabi. Students are responsible for knowing and abiding by the Academic Integrity Policy as set forth in the Student Code of Conduct and the faculty members’ syllabi. All students are expected to do their own work and to uphold a high standard of academic ethics. “
- Classroom demeanor or conduct: Every student should make the lecture a comfortable and enjoyable learning experience. Late entry to the class room or leaving early is bad behavior. Common sense should be practiced and expected.
- Communication: All VSU-related correspondence should be conducted via VSU email addresses for both student and instructor and via the Blazeview.
- **Title IX Statement**
- Valdosta State University (VSU) is committed to creating a diverse and inclusive work and learning environment free from discrimination and harassment. VSU is dedicated to creating an environment where all campus community members feel valued, respected, and included. Valdosta State University prohibits discrimination on the basis of race, color, ethnicity, national

origin, sex (including sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, disability, genetic information, or veteran status, in the University's programs and activities as required by applicable laws and regulations such as Title IX. The individual designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning nondiscrimination policies is the University's Title IX Coordinator: the Director of the Office of Social Equity, titleix@valdosta.edu, 1208 N. Patterson St., Valdosta State University, Valdosta, Georgia 31698, 229-333-5463.

9. Additional Information (at instructor's discretion)

- Expectations for competencies such as writing, technology skills, or performance: Students should be able to describe biological phenomena at the molecular or cellular levels in terms of physics and chemistry.
- Instructional philosophy: I believe reading one book ten times is better than reading ten books one time. This is the case for this course.
- Strategies used to support learning: Students should take advantage of my office hours. Studying as a group (study group) should be a good idea.
- ***I will teach and you will learn in this course. Therefore, your intellectual enhancement from this course will depend on both of us. Would you have any other ideas?***