MICR 4600 Theoretical and Applied Immunology Spring 2023

Section	Class #	Day	Time	Room	Instructor	Contact	Student Hours
Lecture 01	32274	TR	9:25 - 10:40 AM	SH C366	Dr. Edith Porter	eporter@calstatela.edu Tel (323) 343 6353	TR 8:30 – 9 AM ASCL 355 or Zoom[1]
Lab 02	32275	T	10:55 AM- 1:25 PM	ASCL 229	Dr. Michael Chen	mchen@calstatela.edu Tel (323) 343 2061	M 9:30-10:30 AM BIOS 235

[1] **Porter Zoom room**: https://calstatela.zoom.us/j/3233436353?pwd=dGd5T3BsMUFBTFl3OU5DL0p0R2xHZz09, Meeting ID: 323 343 6353, Passcode: 144198

Prerequisites:

- [MICR 3100 or (BIOL 3401 and BIOL 3900)] and [(CHEM 2200 and CHEM 2201) or (CHEM 2201 and CHEM 4310)]; each with a grade of C or better; or instructor consent.

CANVAS:

- The course will be administered through CANVAS **using section MICR 4600-01 for all lecture and lab sections**.
- All course related materials for lecture and labs will be accessible through CANVAS.
- Enrolled students automatically have access to the course web site in CANVAS through their myCSULA portal.
- You can access the Canvas Student Guide by clicking the Help icon on the left side of the CANVAS page or by going to https://community.canvaslms.com/docs/DOC-10701. Contact your instructor if you still have trouble accessing CANVAS.

Email account:

- You must have a CalState LA email account to access CANVAS and receive course related information. To contact your instructors, you must use your CalState LA email account.

Textbooks:

- **Lecture**: Janeway's Immunobiology; 10th Edition by Murphy, Weaver, and Berg. Publisher: Norton; ISBN: 978-0-393-88487-6 (ebook) or ISBN: 978-0-393-88489-0 (hard copy). While the 10th edition is preferred you can also work with the 9th edition ISBN: 9780815345053. The 9th edition textbook is available at the University Bookstore. Cheggs, Amazon, and Knetbooks, among others, offer alterative affordable rent solutions. Free online immunology materials can be accessed through merlotx.org.
- **Laboratory**: The laboratory manual by Dr. Edith Porter is available as PDF file on the course web page. Print it (no need for color printing) and place the pages in a dedicated binder that can be disinfected or let it bind (spiral binder with hard plastic cover pages that can be disinfected is recommended). The manual will also serve as your laboratory notebook and will be graded at the end of the course.

Student learning outcomes: Upon successful completion of this course, you will be able to:

- define the key players of the immune response and explain how the response is orchestrated
- apply this knowledge in understanding diseases arising from a dysfunctional immune system
- describe in general a biomedical laboratory environment
- explain fundamental techniques used in clinical immunology
- describe how immunology can be used as a tool in research settings
- better record, analyze, interpret, and disseminate scientific data
- better formulate questions that lead to deeper understanding

Attendance:

- Lecture and laboratory attendance is **mandatory** and required for meeting the course outcomes and passing the class.

Performance evaluation: **1000 points total**

Lecture: 600 points

20	Pre- and post-course reflective essays (2 worth 10 points each)
50	Active learning
100	Case studies (teamwork; 5 worth 10 points each, 1 final case study worth 50 points)
30	Seminar synopsis and research question
150	Weekly post-lecture quizzes (15 worth 10 points each)
100	Midterm
150	Final comprehensive examination

You will write two ***reflective essays***, one at the very beginning of the class, and one at the end of the class. Instructions for these essays will be posted on CANVAS. These essays aim to help you connect with the class and establish early on significance of the class content to you. ***Active learning exercises*** will consist of various group and individual activities and will be incorporated in the lecture sessions. The points assigned for active learning exercises are for participation. ***Case studies*** will help you to apply your theoretical knowledge to the clinical settings. The cases will be assigned to teams. Detailed instructions for the case studies including resources will be posted on CANVAS. **Asking questions** is the beginning of research and advancement of knowledge occurs through the process of finding answers to these questions. This course aims to improve your ability to ask research questions and draws from Santana, L., & Rothstein, D. (2011). "Make just one change: Teach students to ask their own questions. Harvard Education Press: Cambridge, MA". We will first learn how to ask questions in general and then apply the newly gained skill to a research seminar given by our **Guest Speaker Dr. Pablo Penaloza-MacMaster, Ph.D.**, North Western University. A ***synopsis*** will be prepared based on the seminar presented by Dr. Penaloza-MacMaster. You will summarize the presentation, critically evaluate the talk and its content, briefly discuss how this relates to our class, and then present your own unique research questions ignited by the seminar. To help you process the lecture material in a timely fashion, there will be **weekly CANVAS quizzes** covering the lectures from the preceding week. The first week's quiz will include some questions about the syllabus. The quizzes will open Thursday evenings, allow for two attempts (with the **average** of the scores counting), and will close Sunday nights at 11:55 pm. Midterm and final examination will include 10 points for a ***brief report on a current news article*** (published during the term of this semester) in the <u>general news</u> (newspapers, web etc.) that relates to immunology, either in health and disease or as a tool for diagnostic or research. <u>An article from a science journal is not appropriate.</u> The one-page typed news report will be in the following format: indicate title and author(s), the source and date of publication; a summary of the article in your own words (~ ½ page), a short description of what captured your attention/why you chose this article, and a brief discussion how the selected article <u>specifically</u> relates to immunology and this class. You will upload the completed report along with link to the news article and a copy of the actual text of the article pasted after your summary (all in **one** file). ***Midterm*** and ***final lecture exams*** will consist of multiple-choice questions and short answers, drawings, experimental data analysis, and applications of the question formulation technique.

Laboratory: 400 points

60	Weekly CANVAS prelab quizzes (12 worth 5 points each)
10	Safety quiz
80	Quiz 1 and 2 (40 pts each)
30	3 Graphs (10 pts each, due 1 week after class discussion of the experiment)
50	Lab notebook
50	Poster session (Poster 30 [team], Poster presentation 10 [individual], and Poster evaluations 10 [individual])
120	Final comprehensive examination

We will handle human blood products and body fluids that have been self-collected or purchased. Thus, an **individual general release form** must be signed to participate in all laboratory exercise**.** To ensure proper preparation for the lab exercises **weekly pre-lab quizzes** will be administered through CANVAS. These multiple-choice quizzes are based on the posted laboratory manual and have two attempts with the **average score** counting. They will open Thursday evenings and close Mondays at 11 am. **Face to face quizzes** and the **final exam** will include but are not limited to questions with short answer prompts, fill-in tables, simple calculations, data analysis, brief hand-graphing, and interpretation of graphs. Detailed instructions for **graphs**, **poster**, and **notebook** are included in the lab manual and will be reiterated in class.

Grades: **Based on the total points accumulated you can earn:**

Max 1000 points	B+: ≥ 86 % (860pts)	C+: ≥ 76 % (760 pts)	D+: ≥ 66 % (660 pts)
A : ≥ 92 % (920 pts)	**B : ≥ 82 % (820 pts)**	C : ≥ 72 % (720 pts)	D : ≥ 63 % (630 pts)
A- : ≥ 89 % (890 pts)	B- : ≥ 79 % (790 pts)	C- : ≥ 69 % (690 pts)	D- : ≥ 60 % (600 pts)
			F : < 60 % (< 600 pts)

Class participation and laboratory performance will be considered for the final grade.

Keep track of your points:

	Assignment[1]	**Max Pts**	**Your Pts**
Lecture	Reflective essay 1	10	
	CANVAS post-lecture quizzes	150	
	Case study 1 (Team)	10	
	Case study 2 (Team)	10	
	Case study 3 (Team)	10	
	Case study 4 (Team)	10	
	Case study 5 (Team)	10	
	Final case study (Team)	50	
	Seminar synopsis & research questions	30	
	Midterm	100	
	Final comprehensive examination	150	
	Active learning (mostly Team)	50	
	Reflective essay 2	10	
Lab	CANVAS pre-lab quizzes	60	
	Safety Quiz	10	
	Quiz 1	40	
	Quiz 2	40	
	Graph 1	10	
	Graph 2	10	
	Graph 3	10	
	Lab notebook	50	
	Poster session (Team)	50	
	Final comprehensive examination	120	
	Extra credit for course participation	-	
	TOTAL	1000	

1: Assignments involving teamwork are indicated. The remaining assignments will be individual work assignments.

Study suggestions:

- Always read the assigned chapter and study in particular the accompanying illustrations before attending lectures. Re-read the chapter in detail after you have attended the lecture.
- You must have carefully read the laboratory manual for the experiment of the day before coming to lab. Weekly pre-lab quizzes will test your preparedness.
- Take very good notes during class time.
- Take the required pre- quizzes and post-quizzes after you have reviewed the material
- Summarize each week what you have learned.
- Form study groups with your peers and discuss what is happening in class. Force yourself to explain the material you have learned.
- Create your own tables and concept maps. Create multiple tables that organize the teaching material from different viewpoints.
- Contact your instructors by email and/or come to student hours when you are unclear about the material covered.
- Utilize the resources at the writing center (http://www.calstatela.edu/centers/write_cn/).
- Learn to recognize when you need help and get help in a timely manner.
- Keep track each week how many hours you are studying and in which ways. Remember that per unit 2 – 3 hours study outside of class are required for a good grade.
- Study, study, study, study, study.....

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8a							
9a		Lec		Lec			
10a		Lec		Lec			
11a		Lab					
12p		Lab					
1p		Lab					
2p							
3p							
4p							
5p							
6p							
7p							
8p							
9p							
10p							

General Policies:

- No make-up examination/test/quiz/reports or re-teaching for missed events. Missed events will be set as "0 points" unless satisfactorily justified (e.g. doctor's note) according to "Missed Class Time and Makeup Policy" (https://www.calstatela.edu/academicsenate/handbook/ch5). **Assignments turned in late will not be accepted**!
- The **Drop/Incomplete Policy** explained in the University General Catalogue will be strictly followed (https://ecatalog.calstatela.edu/content.php?catoid=70&navoid=8154&hl=incomplete&returnto=search#ce3).
- You are expected to read and abide by the **University's Academic Honesty Policy**, which can be found at http://www.calstatela.edu/academicsenate/handbook/ch5a. Students who violate this policy will be subject to disciplinary action, and may receive a failing grade in the course for a single violation.
- **You are responsible for the prerequisites** for this course and are encouraged to discuss any questions regarding the policies and prerequisites with the instructor.
- Reasonable accommodation will be provided to any student who is registered with the **Office of Students with Disabilities** and requests needed accommodation. Please contact OSD to arrange for appropriate accommodations.
- **Students in Distress** can seek services provided by the health center (https://www.calstatela.edu/studenthealthcenter/caps), Dean of Students (http://www.calstatela.edu/deanofstudents), and the University (http://www.calstatela.edu/healthwatch).

You are strongly encouraged to work with your instructors throughout the course.

Land Acknowledgement Statement:

Consistent with our values of community and diversity, we have a responsibility to acknowledge and make visible the university's relationship to Native peoples. By offering this Land Acknowledgement, we affirm Indigenous sovereignty and will work to hold Cal State LA more accountable to the needs of American Indian peoples. Prepared by Dr. Kimberly Robertson (Mvskoke) and Tongva Elder Julia Bogany, 2020, and Approved by the Cal State LA Academic Senate on April 27, 2021.

If delivered by a Tongva student, faculty or staff, or invited community member

We, the Indian people, the traditional caretakers of this landscape are the direct descendants of the first people who formed our land, our worlds during creation time. We have always been here. Our ancestors prepared and became the landscapes and worlds for the coming humans with order, knowledge and gifts embedded in the landscape. Our ancestors, imbued the responsibility and obligation to our original instructions, guided by protocol and etiquette to be part of, take care of and ensure the welfare of the extended family and community defined in its most inclusive expression, the NATURE and to pass those teachings and responsibilities onto our children, grandchildren and many generations to come. (AND to all those that now live here.). Written by Tongva Elder Julia Bogany, 2020

If delivered by anyone other than a Tongva student, faculty or staff, or invited community member

With great respect, Cal State LA acknowledges the Tongva people as the traditional caretakers of Tovaangar (TOE-von-gar) – the Tongva world, including the Los Angeles Basin, South Channel Islands, San Gabriel and Pomona Valleys, and portions of Orange, San Bernardino, and Riverside Counties. Cal State LA is located within these lands. As an institution located on unceded Tongva land, we pay our respects to the ancestors, elders, and our relatives/relations, past, present, and emerging.

Planned Schedule *(subject to change)*

Week	Day	Date	Lecture	Lab
1	T	1/24	Course requirements, student assessment **Overview** (Chapter 1)	Check in, laboratory and safety rules Notebook instructions
	R	1/26	History and major concepts of immunology; Cells, organs, and microenvironments of the immune system; Introduction to cytokines; Immunological Techniques *Reflective essay 1 due (10 pts)*	Microscopy (blood cells, lymphatic organs)
2	T	1/31	Question formulation exercise **Innate Immunity**	Cation depletion of saliva Lysoplate *(Graph 1, 10 pts)*
	R	2/2	Anatomical barriers (Chapter 2); Antimicrobial peptides & lipids (Chapter 2)	
3	T	2/7	Complement (Chpt. 2)	*E. coli* radial agar diffusion assay
	R	2/9	Epithelial cells (Chpt. 2); Pattern recognition receptors (Chpt. 3)	Epithelial cells and normal microbiota
4	T	2/14	Phagocytes, Chemotaxis (Chpt. 2,3)	Complement analysis: total hemolytic activity *(Graph 2, 10 pts)*
	R	2/16	NK cells (Chpt. 3); Induced responses of innate immunity (Chpt. 3)	Complement fixation reaction (PP) Bloodborne pathogen training (PP) *(Safety Quiz 10 pts)*
5			**Adaptive Immunity**	Phagocytosis of *Candida albicans*
	T	2/21	Lymphocytes, lymphocyte receptor signaling (Chpt. 7)	
	R	2/23	Antibodies I (Chpt. 4)	
6	T	2/28	Antibodies II (Chpt. 5)	*Quiz 1 (40 pts)*
	R	3/2	B cells (Chpt. 8)	Detection of CRP antigen by latex agglutination Immune electrophoresis (#272) Radial immunodiffusion (#273)
7	T	3/7	*Midterm (100 pts)*	Quantitative ELISA (#278)
	R	3/9	T cells I (Chpt. 4, 5)	
8	T	3/14	T cells II (Chpt. 8)	SDS-PAGE (saliva)
	R	3/16	MHC complex (Chpt. 6)	Lysozyme immunoblot – Day 1
9	T	3/21	T cell mediated immunity I (Chpt. 9)	Lysozyme immunoblot – Day 2
	R	3/23	The humoral immune response (Chpt. 10)	Blood typing- use your own blood
Spring break (3.27 – 4.02.2023)				
10	T	4/4	Integrated dynamics of the innate and adaptive immune response (Chpt. 11)	*Quiz 2 (40 pts)* Detection of antinuclear auto-antibodies
	R	4/6	The mucosal immune response (Chpt. 12)	
11	T	4/11	**Guest Seminar (Zoom): Dr. Pablo Penaloza-MacMaster,** Northwestern University *(Synopsis 30 pts)* **Failures of the Immune system**	Introduction to Flow (PP) Introduction to monoclonal antibodies (PP) Lymphocyte typing for CD4 & CD8 *(Graph 3, 10 pts)*
	R	4/13	Immunodeficiencies I (Chpt. 13)	Introduction to the hemocytometer
12	T	4/18	Immunodeficiencies II (Chpt. 13)	Mononuclear cell isolation
	R	4/20	Allergies and allergic diseases (Chpt. 14)	
13	T	4/25	**Guest Speaker: Dr. Nandita Bose**, HiberCell Inc.	Poster preparation
	R	4/27	Tolerance, autoimmunity, transplantation (Chpt. 15)	
14	T	5/2	Cancer and the immune system (Chpt. 16) **Clinical Applications of Immunology**	*Poster session (50 pts)*
	R	5/4	Serology; Immunotherapies (Chpt. 16)	
15	T	5/9	Vaccines (Chpt. 16)	*Lab final (120 pts)*
	R	5/11	*Final Case Study Presentations (50 pts)*	

PP: PowerPoint only

Final Examination (150 pts): TBA

Reflective essay 2 (10 pts) due Friday, May 19, 2023; 11:55 pm