Course Title: Immunology
Course Number: E304
Credits: 4
Course Directors: Mary Baylies, Ph.D. and Morgan Huse, Ph.D.
Course Prerequisites: Experimental Biology; Cancer Engineering Core Course
Grading Policy: Letter Grade

Course Description and Learning Objectives

This course is designed to familiarize students with cellular, molecular, and biochemical aspects of the development of the immune system and the immune response. The course focuses on the development of the immune system and the function of its major components. The course will end with an overview of recent developments in immunotherapies in oncology and how engineering principles have been used to develop these therapies.

By the end of this course, students should have broad knowledge of the following topics:

- Innate Immune Response
- Adaptive Response
- Basics of tumor Immunology
- Immunotherapies, specifically those used in oncology

Course Structure

The course meets daily from 9:30 am – 12:30 pm for four weeks. Changes to that schedule are posted on the course grid and communicated to students via email.

Teaching Fellows

Teaching Fellows, drawn from senior GSK students and the postdoctoral community at MSK, are present in the course sessions. Their role is to act as an additional source of information/assistance, to help keep the discussion sessions moving, to conduct a review session, and to observe and grade the students on their participation. Each Teaching Fellow covers one week of the course. Additionally, the Teaching Fellows will prepare a minimum of 2 to 3 questions from their section for the student problem set.

Assignments and Methods for Assessing Student Achievement

Take Home Exams (67%)

Students will be evaluated on their grasp of the concepts learned in class by completing take-home problem sets. Each problem set will include 4 or 5 questions that are worth 20 to 25 points each. The questions will include, but are not limited to, cases studies or interpretation of journal articles.

Class Participation and Attendance (33%)

Each student will be responsible for presenting at least one journal article. They must highlight the relevant background of the paper and its importance and caveats. All other students are expected to have come to class having thoroughly read the pre-assigned journal articles. They

must also engage in the journal discussions by asking and answering relevant science questions.

All students are expected to attend the GSK Core Class regularly and on time. A student must notify the Senior Registrar/Curriculum Specialist and teaching fellow prior to class if they are going to be absent. This notice should be sent by email to mcdonagd@sloankettering.edu. A student is allowed a total of 3 absences across all courses that meet from February 2, 2026 through May 1, 2026 (i.e. absences are tallied over the entire semester and not per course). Any absences in excess of 3 will result in 4 percentage points being subtracted from a student's participation grade PER ABSENCE in the course in which the threshold was reached.

Basis for Grade Determination

Students will receive a final letter grade based on their class participation (33%) and performance on the take home problem sets (67%). The final letter grade will be determined using the following grading scale:

Letter Grade	Range
A	85-100
A-	82-84
B+	78-81
B	75-77
B-	72-74
C+	68-71
C	65-67
C-	62-64
F	<62

The problem sets will be sent out via email before 3:00 pm on the date specified in the course schedule; they will be due 7 days later, by 3:00 pm. Late submissions may not be accepted and could impact the final grade for the course.

Course Evaluation

Students are expected to complete surveys regarding the lectures and overall course via their student portal. This feedback will be used to evaluate the effectiveness and relevance of the topics and provide direction for the subsequent iterations of the course.

Academic Dishonesty, Plagiarism and Artificial Intelligence

The Policy can be found in the Student and Faculty Handbook linked on the GSK Website.

Course Schedule

The course schedule can be found on the next page.

Section II - Immunology - Mary Baylies and Morgan Huse, Course Leaders				Student Presenter	Teaching Fellow	Block
	Topic	**Instructor**	**Date**			
1	Overview of Immunology: molecules, cells and tissues	Brianna Naizir	Monday, February 2, 2026	No Paper	Zhang, Linsey	1
2	Rearrangements of antigen receptor genes	Jayanta Chaudhuri	Tuesday, February 3, 2026	No Paper	Zhang, Linsey	1
3	B cell development and differentiation	Jayanta Chaudhuri	Wednesday, February 4, 2026	Hanselman, Olivia/Illouz, Sylvia	Zhang, Linsey	1
4	Innate Immunity	Justin Perry	Thursday, February 5, 2026	Lange, Matthew	Zhang, Linsey	1
	Amazon Web Services Antibody Design Platform **3:00-4:30**	Nai-Kong Cheung	Thursday, February 5, 2026			
5	Tumor Immunology	Vinod Balachandran	Friday, February 6, 2026	Levin, Bailey/Li, Faye	Zhang, Linsey	1
6	Immune Cell Migration and Invasion	Mariia Akhmanova	Monday, February 9, 2026	Magnus, Karina	Lang Goldgewicht, Andrea	2
7	NK cells and innate lymphocytes	Joseph Sun	Tuesday, February 10, 2026	McIlhenny, Lauren	Lang Goldgewicht, Andrea	2
8	Lymphocyte activation	Morgan Huse	Wednesday, February 11, 2026	Mutaher, Mohammed	Lang Goldgewicht, Andrea	2
9	Transplant Immunology	Alan Hanash	Thursday, February 12, 2026	Perea del Angel, Ana	Lang Goldgewicht, Andrea	2
10	Immune surveillance and checkpoint inhibitor immunotherapy in cancer	Luc Morris	Friday, February 13, 2026	Pope, Eleanor/Prabakaran, Adithya	Lang Goldgewicht, Andrea	2
	PRESIDENT'S DAY - NO CLASS		Monday, February 16, 2026			
	Problem set I, topic #1-10, Distribute 2/16/2026 and due 2/23/2026		Monday, February 16, 2026			
11	Antigen Presentation and Dendritic Cells	Chrysothemis Brown	Tuesday, February 17, 2026	Styers, Hannah	Lau, Joshua	3
12	MHC and antigen presentation **9:30-12:30**	Alexander Rudensky	Wednesday, February 18, 2026	Sussman, Carleigh	Lau, Joshua	3
13	T cell development and differentiation **1:30-4:30**	Alexander Rudensky	Wednesday, February 18, 2026	Ta, Christina/Tarrab, Stephanie	Lau, Joshua	3
14	Immune cell metabolism	Santosha Vardhana	Thursday, February 19, 2026	Volpe, Christina	Lau, Joshua	3
15	Fetomaternal Tolerance	Gabrielle Rizzuto	Friday, February 20, 2026	Group activity	Lau, Joshua	3
16	Host-pathogen interactions: immune evasion by pathogens	Tobias Hohl	Monday, February 23, 2026	Ahmed, Nibras	Turkay, Ecenur	4
17	Tumor immunity: basic concepts	Ming Li	Tuesday, February 24, 2026	Afroz, Jalwa	Turkay, Ecenur	4
18	CAR T cell therapy for brain tumors: bench to bedside to bench	Ivan Kotchetkov	Wednesday, February 25, 2026	Beattie, Kai	Turkay, Ecenur	4
19	From the World's Deadliest Bacteria to Cancer Therapy: Lessons from TB and BCG	Yaprak Ozakman	Thursday, February 26, 2026	Group activity	Turkay, Ecenur	4
20	Signal transduction and cell death during inflammation	Alex Gitlin	Friday, February 27, 2026	all students preapred to present	Turkay, Ecenur	4
	Problem set II, topic #11-20, Distribute 2/27/2026 and due 3/6/2026		Friday, February 27, 2026			