# BioMed 514, Immunobiology (3 credits, Spring Semester)

This is a comprehensive immunology course covering the organs, tissues, cells, molecules and genes that make up the innate and adaptive immune systems. Didactic lectures by the faculty and problem-based discussion sessions will introduce students to the fundamentals of modern immunology with emphasis on experimental methods and discoveries from the primary literature.

The course is taught by a team of faculty members with expertise in various areas of immunology. While this structure enhances the rigor and accuracy of the subject matter, we understand that most students will not consider immunology as their primary area of interest. The goal of BioMed 514 is to facilitate the understanding of immunology by encouraging students to ask questions during the lectures and by student participation in weekly discussion sessions for which students prepare written answers to each problem set. These small groups offer students the opportunity to explain the homework material to each other and to ask questions of the discussion facilitator. Assessment is based on homework grades, quizzes and two exams.

**Faculty**

Xuexian Yang, Ph.D. & Aaron Neumann, Ph.D., course directors
Judy Cannon, Ph.D. Bryce Chackerian, Ph.D.
Barbara Masten, Ph.D. Paulus Mrass, Ph.D.
Robert Rubin, Ph.D.

**Textbook**

Abbas, Lichtman, and Pillai, Cellular and Molecular Immunology, 8th edition 2015 or 9th edition 2018 (ISBN 978-0-323-22275-4)

**Class attendance**

- Monday or Thursday, 11:00 – 12:30, Zoom: didactic lecture
- Monday or Thursday, 11:00 – 12:30, Zoom: Student directed, faculty facilitated discussions on problem set. Written answers to problem set due at end of session.

| **Grade** | % of grade | |
|---|---|---|
| • **Problem set write-ups** | 36% | 3 pts/each |
| • **Quizzes** | 11% | 1 pt/each |
| • **Exams**: Midterm and Final | 53% | 26.5 pts/each |
| • **Extra credit**: Problem #1 ready before each lecture | up to 12% | 1 pt/each |

**Topics** (not necessarily in this order)

- Introduction: overview, structural organization and evolutionary considerations
- Innate immune recognition and the inflammatory response
- The major histocompatibility complex structure and function
- Antigen processing and presentation
- Antigen receptors and creation of the B- and T-cell repertoire
- Lymphocyte development, maturation and central B- and T-cell tolerance
- Primary immunodeficiency diseases
- Regional immunity
- Intracellular signaling machinery
- Cell-mediated immunity
- Humoral effector responses: peripheral response of B cells and T cell/B cell interactions
- Peripheral immune tolerance, autoimmunity, and autoimmune disease
- Immune responses to bacteria and viruses; vaccines
- Immediate hypersensitivity/allergic disease

Updated October 2020