



HBIO 499 – Integrative Pathophysiology (4 Units) **Fall 2025**

Lecture: Tue/Thur 3:30pm-5:00pm (PST)

Location: KAP 148

Instructor

Charles Kikutaro Crawford (Kiki), PhD

Office: PED 109

Office Hours: TBD

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Course Description

This course analyzes the physiological mechanisms and manifestations of disease processes that affect human body systems.

Learning Objectives

The primary learning objective of this course is to develop an understanding of the immunological processes and comprehensive pathophysiological changes that occur in various diseases and conditions.

- Discuss the cellular and molecular basis of disease processes across multiple organ systems including the renal, respiratory, reproductive, sensory, and integumentary systems.
- Contrast the manifestation and foundational biology of infectious diseases, cancer, and pathologies driven by genetic, environmental, or idiopathic factors.
- Interpret the role and function of the immune system across different pathophysiological conditions.
- Analyze clinical case studies to identify pathologies and determine underlying mechanisms and appropriate approaches to treatment.
- Assemble primary research articles as supporting evidence to case study analysis.

Prerequisites

Required: BISC 220Lg or BISC 221Lg, HBIO 301L

Required Book

Porth's Pathophysiology: Norris 10th Edition

Other Required Materials

You will need an internet-enabled device with browser capabilities such as a computer or tablet. We will use Brightspace for course communication and to submit your homework assignments.

[USC Technology Rental Program](https://itservices.usc.edu/spaces/laptoploaner/) (<https://itservices.usc.edu/spaces/laptoploaner/>): Students who need resources to participate in this class can apply to the university's equipment rental program. The Student Basic Needs team

will work with you to distribute equipment (if you are eligible). Please visit <https://studentbasicneeds.usc.edu/resources/technology-assistance/> to apply and for more information.

Two review articles will be provided on Brightspace to be used as preparatory reading for lectures on neurotrauma and COVID-19.

Fesharaki-Zadeh A. Chronic Traumatic Encephalopathy: A Brief Overview. *Front. Neurol.* 2023, 10:713. doi: 10.3389/fneur.2019.00713

Yuan Y, Jiao B, Qu L, Yang D, Liu R. The Development of COVID-19 Treatment. *Front Immunol.* 2023, 26;14:1125246. doi: 10.3389/fimmu.2023.1125246. PMID: 36776881; PMCID: PMC9909293.

Lecture Policies

Lectures will be provided in-person without recordings. Zoom lectures may be given in the event of extenuating circumstances such as instructor illness.

Lecture presentations are not to be disseminated beyond this course.

Attendance is not formally collected, though it is essential for success in the course.

Grading Breakdown

Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam (cumulative)	30%
Homework Assignments	15%
Case Studies	15%

Grading Scale

A	94-100
A-	90-93.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	77-79.99
C	73-76.99
C-	70-72.99
D+	67-69.99
D	63-66.99
D-	60-62.99
F	≤59.99

Exams

There will be two midterm exams and one final exam. Exams will be done in-person and on paper.

Makeup exams will only be provided if the student has pre-approval by the instructor (provided for religious holidays, athletic competitions, etc) or a documented excuse providing evidence of necessity (illness, medical emergency, etc). Instructor pre-approval must be acquired within the first 3 weeks of the semester.

Homework Assignments

Five total homework assignments will be posted on Brightspace. Homework assignment due dates will be posted on Brightspace. Late homework assignments will be accepted for one week following the due date, with a maximum grade of 80%.

Case Studies

Six total case studies will be provided and investigated in small groups. These case studies will emphasize physiological mechanisms and applicable treatments in different pathophysiological conditions. Students will perform literature searches to provide solutions to real case problems and submit answers on Brightspace as a group. Late case studies will be accepted for one week following the due date, with a maximum grade of 80%.

OSAS Accommodations

Please provide OSAS Accommodations letters to your instructor within the first two weeks of the course to allow the facilitation of your accommodation.

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The use of artificial intelligence on homework assignments or projects is unacceptable.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Course Schedule

Date	Lecture Topic	Reading Chapter
Aug. 26	Course Introduction and Homeostasis	Chapter 1
Aug. 28	Cellular Injury and Programmed Death	Chapter 3
Sep. 2	Immunology: Innate	Chapter 11
Sep. 4	Immunology: Adaptive	Chapter 11
Sep. 9	Leukocytes	Chapter 24
Sep. 11	Inflammation and Autoimmune Disease	Chapter 9
Sep. 16	Infectious Disease	Chapter 10
Sep. 18	Allergens and Vaccination	Chapter 12
Sep. 23	Neoplasia	Chapter 6
Sep. 25	Exam 1	
Sep. 30	Integumentary Pathology	Chapters 52
Oct. 2	Reproductive Pathology	Chapter 43
Oct. 7	Reproductive Pathology	Chapter 45
Oct. 9	Fall Recess	
Oct. 14	Skeletal Pathology	Chapter 50
Oct. 16	Respiratory Pathology	Chapter 31
Oct. 21	Renal Pathology	Chapters 33
Oct. 23	Renal Pathology	Chapter 34
Oct. 28	Fluid/Electrolyte Imbalance	Chapter 8
Oct. 30	Acidosis/Alkalosis	Chapter 8
Nov. 4	Exam 2	
Nov. 6	Neurotrauma	Fesharaki-Zadeh, 2019
Nov. 11	Veteran's Day	
Nov. 13	Neurodegenerative Pathology	Chapters 15 & 16
Nov. 18	Sensory Pathology: Somatosensation	Chapter 14
Nov. 20	Sensory Pathology: Vision	Chapter 19
Nov. 25	Sensory Pathology: Hearing	Chapter 20
Nov. 27	Thanksgiving	
Dec. 2	Sleep and Circadian Pathology	Chapter 17
Dec. 4	COVID-19	Yuan et al, 2023
TBA	Final Exam	

Support Resources

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710
studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu

Non-emergency assistance or information.