



# USC University of Southern California

**Course** BISC 411 Advanced Cell Biology

**Units:** 4

**Term—Day—Time:** Spring 2022, MW, 11:00 AM

**Location:** RRI 321

**Instructors:**

Don Arnold      RRI 204B      Ph: (213) 821-1266  
[darnold@usc](mailto:darnold@usc).      Office Hours: TBD

Emily Liman      HED 301      Ph: (213) 821-1454  
[liman@usc](mailto:liman@usc).      Office Hours: TBD

**Teaching Assistant:** None

## Course Description

This course will explore the current understanding of basic cellular processes. It is geared towards advanced Biological sciences majors who have taken BISC 320. The course will be divided into two parts. In the second part of the course, Prof. Liman will examine transport across cell membranes, and cell signaling. In the second part of the course, Prof. Arnold will concentrate on synthesis, processing, and trafficking of proteins. Where possible, we will discuss how cellular processes are important at the level of the tissue and of the organism, both in normal physiology and in disease states. A major component of the course will be the discussion of original research papers, each of which directly addresses a topic that is discussed in the lectures. Participation in class is mandatory.

## Learning Objectives

By the end of this course, students will be able to:

1. Assess whether data obtained in a cell biology experiment are necessary and/or sufficient to support specific conclusions.
2. Design experiments to test specific hypotheses related to Cell Biology.
3. Demonstrate mastery of the basic terms and methods used to describe cellular signaling.

4. Demonstrate mastery in reading and interpreting the primary literature as it relates to membrane receptors and channels, cellular signaling, and sensory transduction

**Prerequisites:** none

**Co-Requisite(s):** none

**Concurrent Enrollment:**

None

**Recommended Preparation:** BISC 320

**Course Notes:**

All notes will be posted on blackboard.

**Communication:**

Will be through in-class announcements and blackboard.

**Technological Proficiency and Hardware/Software Required:**

None

**USC Technology Rental Program**

We realize that attending classes online and completing coursework remotely requires access to technology that not all students possess. If you need resources to successfully participate in your classes, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please submit an [USC Technology Rental Program Application](#).

**USC Technology Support Links**

[Zoom information for students](#)

[Blackboard help for students](#)

[Software available to USC Campus](#)

**Required Materials**

none

**Optional Materials**

Molecular Cell Biology, sixth edition; Lodish, Berk, Kaiser, Krieger, Ploegh, Amon, and Martin; Freeman Publishing, 2016. Other readings will be distributed.

## Description of Assessment:

Assessment is based on one midterm exam and the final exam. Exams questions will be short answer, fill in the blank, and multiple choice. In general, a single correct statement will be worth 1 point and an incorrect statement will result in the deduction of 1 point. The exam covers only the material

## Participation:

The participation grade is based on participating in discussions of assigned papers. Full credit will be awarded if a student participates in the discussion of at least 7 papers (2%/paper). There is no makeup alternative.

## Grading Breakdown

	% of Grade
Midterm	43
Final	43
Participation	14
Total	100

## Grading Scale:

This course will be graded on a curve based on the total number of points earned.

## Course-specific Policies

There is no makeup exam. If you need to miss the midterm, you must submit a doctor's note within 1 business day of when the exam was scheduled. If a valid doctor's note is submitted, you will have the opportunity to submit a paper on a topic related to the course, but selected by the instructor. The grade for this paper will be used in place of the midterm grade. The length will be between 4-5 pages. Participation in person is expected, barring unforeseen circumstances.

## Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" [\\_](#)

[policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#).

### **Students and Disability Accommodations:**

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](http://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

### **Support Systems:**

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*

[studenthealth.usc.edu/counseling](http://studenthealth.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](http://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) 740-9355(WELL), press "0" after hours – 24/7 on call*

[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

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

*Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086*

[eeotix.usc.edu](http://eeotix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*

[usc-advocate.symplicity.com/care\\_report](http://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

*The Office of Student Accessibility Services (OSAS) - (213) 740-0776*

[osas.usc.edu](http://osas.usc.edu)

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

*USC Campus Support and Intervention - (213) 821-4710*

[campussupport.usc.edu](http://campussupport.usc.edu)

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

*Diversity, Equity and Inclusion - (213) 740-2101*

[diversity.usc.edu](https://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://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](https://dps.usc.edu)

### **Non-emergency assistance or information.**

*Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)*

[ombuds.usc.edu](https://ombuds.usc.edu)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

*Occupational Therapy Faculty Practice - (323) 442-3340 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)*

[chan.usc.edu/otfp](https://chan.usc.edu/otfp)

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

## **Zoom etiquette**

In the event that some classes will be attended by zoom, students will be expected to keep their cameras on during the entire class. If this is not possible, students must notify the instructor before the class.

## **Asynchronous session recording notice**

In general asynchronous sessions will not be recorded and provided, unless otherwise indicated. USC has a policy that prohibits sharing of any synchronous and asynchronous course content outside of the learning environment. SCampus Section 11.12(B). Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

## **Residential and Hybrid Streaming Model Courses**

Continuously updated requirements related to COVID-19 can be found on the [USC COVID-19 resource center website.](#)]

DATE	SUBJECT / READING (LECTURER)
Jan 8 MON (Lecture 1)	Intro to the class/Basic concepts and terms (EL)
Jan 10 WEDS (Lecture 2)	Membrane transport, pumps, symporters, Chapter 11.1-11.6 (EL)
Jan 15 MON (NO Class)	NO CLASS: Martin Luther King Day
Jan 17 WED (Lecture 3)	Membrane potential, transepithelial transport
Jan 22 MON (Lecture 4)	Ion channels, structure function and diversity, Chapter 23.2 (EL)
Jan 23 WED (Lecture 5)	Paper 1: Jentsch paper (K <sup>+</sup> channels and disease) (EL)
Jan 29 MON (Lecture 6)	The nerve impulse and synaptic transmission, Chapter 23.3 (EL)
Jan 31 WED (Lecture 7)	Paper 2:
Feb 5 MON (Lecture 8)	Cell Signaling (EL)
Feb 7 WED (Lecture 9)	Paper 3: Marx paper (cardiac signaling) (EL)
Feb 12 MON (Lecture 10)	Sensory Signaling (EL)
Feb 14 WED (Lecture 11)	Liman Paper 4: Caterina paper (Cloning the capsaicin receptor)
Feb 20 MON (No class)	NO CLASS: President's Day
Feb 22 WED (Lecture 12)	Sensory Signaling II (EL)
Feb 27 MON (Lecture 13)	Paper 5: Liman paper (Cloning a sour taste receptor) (EL)
Mar 1 WED (Lecture 14)	Review session (EL)
Mar 4 MON (Exam 1)	<b>MIDTERM EXAM</b>
Mar 8 Wed (Lecture 15)	Techniques for Studying Cells I (DA). <span style="float: right;">Chapter 9</span>
Mar 13 & 15	SPRING BREAK



DATE	SUBJECT / READING (LECTURER)
Mar 18 MON (Lecture 16)	Techniques for Studying Cells II Chapter 9 Organelles (DA)
Mar 20 WED (Lecture 17)	Secretory Pathway (DA) Chapter 12
Mar 25 MON (Lecture 18)	Secretory Pathway II (DA) Chapter 12
Mar 27 WED (Lecture 19)	Paper 1 Presley et al. (DA)
Apr 1 MON (Lecture 20)	Insertion of Proteins into the ER (DA) Chapter 12
Apr 3 WED (Lecture 21)	Paper 2 Kalderon et al (DA)
Apr 8 MON (Lecture 22)	Protein Modifications/ Trafficking Signals (DA) Chapter 10
Apr 10 WED (Lecture 23)	Paper 3 Folsch et al. Receptor-mediated Endocytosis (DA) Chapter 13
Apr 15 MON (Lecture 24)	Vesicular Traffic/Synaptic Vesicles (DA) Chapter 13 Paper 4 Weber et al
Apr 17 WED (Lecture 25)	Actin and Microtubules (DA) Chapter 16
Apr 22 MON (Lecture 26)	Kinesin and Myosin (DA) Chapter 16
Apr 24 WED (Lecture 27)	Paper 5 Lewis et al
May 1 Wed 11:00 AM	<b>FINAL EXAM</b>