

# Systems Cell Biology

University of California, Irvine

- This course takes a systems biology approach to cell biology.
- We use math and computer modeling to attempt to understand aspects of cell biology at a deeper level than is possible from just looking at textbook figures and wiring diagrams.
- We use Mathematica and Python for our computational models.

## Winter 2022 Syllabus (version: 3 January, 2022)

Dev Bio 232 – Graduate – 4 units – Course Code 08850

BME 213 – Graduate – 4 units – Course Code 13945

Instructors:

Professor Lee Bardwell

[bardwell@uci.edu](mailto:bardwell@uci.edu)

<https://faculty.sites.uci.edu/bardwell/>

Professor Steve Gross

[sgross@uci.edu](mailto:sgross@uci.edu)

Time and Place:

Tues & Thur 2:00-3:20 PM

Required Computer Software:

Mathematica

Info on how UCI students can use the campus license can be found here:

<https://www.oit.uci.edu/help/research-software/>

Python

Canvas Course Site for 2022 (enrolled students only)

<https://canvas.eee.uci.edu/courses/43917>

## Systems Cell Biology 2022 TOPIC/LECTURE OUTLINE

- The schedule below is subject to change.

<u>Date</u>	<u>Topic</u>	<u>Professor</u>	
Tue 4 Jan	<b>Intro to Systems Biology, Cells &amp; Scales</b>	Bardwell	
Thu 6 Jan Tue 11 Jan Thu 13 Jan Tue 18 Jan	<b>Module I: Toolkit for Systems Biology</b>	Bardwell	
Thu 20 Jan Tue 25 Jan Thu 27 Jan Tue 1 Feb	<b>Module II: Gene Regulatory Networks</b> <b>Gene Regulation 1</b> <b>Networks &amp; Motifs</b> <b>Gene Switches and Autoregulation</b> <b>Gene Regulation 2</b>	Bardwell	
Thu 3 Feb Tue 8 Feb Thu 10 Feb	<b>Module III: Ultrasensitivity, Synergy, and Cooperativity</b>	Bardwell	
Tue 15 Feb Thu 17 Feb Tue 22 Feb Thu 24 Feb	<b>Module IV:</b> <b>Molecular Motors, Statistics, Stochastics and Single Molecule Analysis</b>	Gross	
Tue 1 Mar Thu. 3 Mar	<b>Nonlinear Dynamics</b> <b>Negative Feedback</b>	Bardwell	
Tue 8 Mar Thu 10 Mar	<b>Class Projects Presented</b> <b>Class Projects Presented</b>	Bardwell/Gross	

**Thursday 17 March, 1:30-3:30 PM: Final Exam**

**(last homeworks may be due Friday 18 March at 9 PM)**