

Cell and Developmental Biology

Biol 205H, Spring 2020

Course Description

BIOL 205H Cellular and Developmental Biology is an Honors course. In this course, you'll learn how cells work and how organisms develop, including some of the fundamental experiments and discoveries that have built up humankind's understanding of these topics to date.

Target audience

This is an honors course and part of the series of core courses in Biology. We will seek your input on some interactive honors-specific activities that we are planning. The material that we present will mirror what is presented in non-honors sections, plus we will use some class periods for hands-on enrichment activities and discussions. These activities are designed to give you experiences related to the course topics, and to give you time to interact informally with the instructors and with each other. Enrichment activity days will replace lecture time, so students will be responsible for learning some material from textbook readings, bringing questions about the readings to the next lecture.

Prerequisites

Students must have completed Biol 202 or Biol 202H. Honors Carolina students have priority for registration slots. If spaces are available, other students with at least a 3.0 GPA may register as well.

Instructors

Dr. Bob Goldstein
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Dr. Amy Shaub Maddox
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General Course Policies

We want each of you to do well, but for this to happen we need you to do your part. Please take advantage of all of the opportunities to learn and review the material. To facilitate this, attendance at all classes and activities is essential. Anyone who does poorly on any exam is strongly encouraged to meet with the professor at the earliest possible time to plan how to improve performance on the next exam.

Please come to class prepared to ask questions. If you do not understand a point in lecture or in your readings, please feel free to interrupt by asking a question. Do not feel intimidated or embarrassed to ask questions! Note that we would prefer not to answer questions about lecture material by email. This does not mean that we do not want to discuss the material with you, but merely that email is not a good mechanism of doing so. It could take several days of emailing back and forth to answer a question we could address in minutes in a conversation after class. We are happy to stay at the end of class to answer questions. Anyone who wishes to audio record lectures is free to do so.

Course Materials

Course materials that we provide (exams, lecture slides, lecture outlines, etc) are copyrighted and may not be distributed to third parties including web-based course material collections. You are of course welcome to download copies of the course materials that we provide onto your own computer. This can be especially valuable to you in the unlikely event that a server goes down before an exam, limiting your access to the course web site. Lecture materials will be uploaded to the course web site (for the first half of the course: <http://labs.bio.unc.edu/Goldstein/205HSpring2020/>) or to Sakai (for the second half of the course) before each lecture.

Required Texts

First half of course: Essential Cell Biology, 5th Edition (Bruce Alberts and coauthors, 2019).

Second half of course: Principles of Development, 5th Edition (Lewis Wolpert, Cheryll Tickle, and Alfonso Martinez Arias, 2015)

Course Goals and Student Learning Objectives

This course will make you fluent in the following topics, which we consider to be both important — forming a fundamental basis for understanding human diseases, for example — and interesting. The course will also help build your understanding of how scientific knowledge in these areas has been, and continues to be, built up through creative design of scientific experiments. You will learn to think critically about how discoveries are made, and you will gain increased appreciation for creative experimental design.

Cell Biology Lecture Topics:

- Introduction to Cell Biology
- How to Study Cells
- Protein Structure and Function
- Membranes and Transport
- Mitochondria
- Intracellular Compartments and Transport
- Cell Communication
- Cytoskeleton
- Cell division
- Cell Cycle and Cancer

Developmental Biology Lecture Topics:

- Cleavage / Cytokinesis
- Gastrulation
- Axis determination
- Organ development (*C. elegans* vulvagenesis)
- Drosophila* segmentation, polarization, and axis determination
- Regeneration and Metamorphosis (de-differentiation, epigenetics, molting, imaginal discs)
- Stem cells
- Mice and IVF (early mouse development, ES cells, transgenesis)
- Cancer (oncogenes, tumor suppressors, vasculogenesis, metastasis)

Course requirements and grades

100% of your final grade will be determined by your performance on four exams, each given equal weight. Each exam will cover only the material indicated on the syllabi. Exam questions will be taken from lectures, activities and assigned readings. Exams must be taken on the dates indicated during the regular class period. Makeup exams will only be given in exceptional circumstances, i.e., medical or family

emergency documented in writing. You must notify your professor of such an emergency before the time of the regular exam. The makeup exam may be in a different format than the in-class exam.

Your course grade will be determined as follows. Course instructors may curve final grades upwards.

A final course average of 93 or above will earn you an A

A final course average of 90 to 92 will earn you a grade no lower than A-

A final course average of 87 to 89 will earn you a grade no lower than B+

A final course average of 83 to 86 will earn you a grade no lower than B

A final course average of 80 to 82 will earn you a grade no lower than B-

A final course average of 77 to 79 will earn you a grade no lower than C+

A final course average of 73 to 76 will earn you a grade no lower than C

A final course average of 70 to 72 will earn you a grade no lower than C-

A final course average of 67 to 69 will earn you a grade no lower than D+

A final course average of 63 to 66 will earn you a grade no lower than D

A final course average of 60 to 62 will earn you a grade no lower than D-

Exam dates

Exam dates are listed on the course web site. The last exam is given in compliance with university final exam policy and is scheduled according to the UNC Final Exam calendar.

Diversity statement

The Department of Biology values the perspectives of individuals from all backgrounds reflecting the diversity of our students. We broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. We strive to make this classroom and this department an inclusive space for all students.

The professors reserve the right to make changes to the syllabus, including project due dates and test dates. These changes will be announced as early as possible.