

Fall 2023

## **BIOL 200-H01, H03: Concepts in Biology - Honors**

Caroline DeVan

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### **Recommended Citation**

DeVan, Caroline, "BIOL 200-H01, H03: Concepts in Biology - Honors" (2023). *Biology Syllabi*. 84.  
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## BIOLOGY 200 – Concepts in Biology – Honors Sections 1 & 3

### Instructors and Office Hours

#### Lecture

Dr. Caroline DeVan (pronouns: she/her) ([caroline.m.devan@njit.edu](mailto:caroline.m.devan@njit.edu))

Office hours by appointment and weekly (no appointment needed) on

- Monday 3:00pm-4:30pm
- Tuesday 10:00am – 11:30am

Office: CKB 340F, can meet in person or online via zoom (link posted to canvas)

#### Recitations

Section H01- Grant Bowers (pronouns: he/him) ([gb364@njit.edu](mailto:gb364@njit.edu)), Office hours: by appointment.

Section H03 – Roxy Nadim (pronouns: she/her) ([rln3@njit.edu](mailto:rln3@njit.edu)), Office hours: by appointment.

**Course Meetings:** Class meets twice weekly for lecture and once weekly for recitation.

**Course Website:** <http://canvas.njit.edu/>.

**Lecture:** Monday and Wednesday, 10:00am-11:20am

Mondays - Tiernan Lecture Hall 1

Wednesdays - Kupfrian 118

**Recitation:** Recitations start the first week of classes,

Section H01: Friday 1:00pm - 2:20pm, CKB 220

Section H03: Thursday 1:00pm – 2:20pm, CKB 126

NJIT Campus Map: [www.njit.edu/about/visit/njit-maps.php](http://www.njit.edu/about/visit/njit-maps.php)

This course is offered in the Face-to-Face Instructional Delivery Mode. All students are expected to follow NJIT's COVID-19 guidelines: please see NJIT's Pandemic Recovery Plan for more information and updates:

<https://www.njit.edu/pandemicrecovery/>.

### Course Description:

This course will introduce students to the study of biology at the beginning of their undergraduate career. Central ideas in the biological sciences will be highlighted, with an emphasis on the process of scientific discovery and investigation. The course will provide the basis for more advanced coursework and learning experiences in biological sciences as students delve into the curriculum of study. This is a required course for all NJIT and Rutgers-Newark Biology majors.

### Textbook and Required Materials:

- **Canvas.** You need to ensure that you can access the course website (<http://canvas.njit.edu>) ASAP! Log-in with your UCID.
- **Textbook.** We will use the textbook OpenStax+ Biology 2e, supplemented with additional readings. All supplemental readings will be provided via links on the course website. OpenStax+ will be accessible through SimUText where you will also complete follow-up reading assignments (graded quizzes) in preparation for the week's class.
- **SimUText.** Along with access to the OpenStax+ Biology 2e textbook and reading quizzes, we will be using SimUText to access several SimBio tutorials and labs that will be completed for homework and sometimes as a part of recitations. The cost of a subscription is \$37.50 when purchased through SimBio: <https://www.simutext2.com/student/register.html#/key/UZXg-Z2kY-2zEf-bCx4-nAcV>. To purchase using financial aid, please contact the NJIT Bookstore. See Canvas for additional information.
- **iClicker REEF app.** In order to gauge your understanding of topics we discuss in lecture, I will regularly poll the class using the iClicker REEF app. Go to the following link to subscribe to the app:

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<http://iclicker2.wpengine.com/students/apps-and-remotes/apps>. You can also use a physical iClicker remote, but you will still need to register it with iClicker. See Canvas for additional information.

- **Writing Materials.** You should bring materials to take notes to every class meeting. Handwriting notes is recommended.
- **Laptop or tablet.** Some classes (and all recitations) will require the use of a laptop or tablet.

## Communication with instructor

- **In-person communication during class and office hours and the Canvas message app are the preferred forms of communication.** If you do talk to me before/during/after class asking me to do a task, please send a follow-up email through the Canvas message app. You can email me directly as well, but I may respond more slowly. When emailing me through the Canvas app or directly please indicate your full name and the course you are in as part of the email subject line. I will be checking the Canvas messaging app and my email regularly throughout the work week during normal business hours. Outside of these times I will respond to messages and emails as soon as possible, but do not expect an immediate reply.
- **Office hours:** Office hours are open times when you can come discuss with me any questions or concerns you have about the course or course material. Office hours will be held each week at the regularly scheduled times. You can visit my office or attend via Zoom – use the Office Hours zoom links posted to canvas. You DO NOT need an appointment to attend office hours. If you are attending online you may need to get my attention when you show up so I know you are there. You should also make sure when you sign in that it displays your full name so I know who I am meeting with.
- **Appointments:** I am always happy to make an appointment with a student. Ideally appointments should be made in advance. To schedule an appointment, you should message me through the Canvas app – be sure to include your name, the class you are in, and the times you are available to meet in your message. Appointments can be in person or via Zoom – please indicate your preference.

## Course Policies:

- All course materials (including recordings of lectures) are for students' own use only (no sharing or posting anywhere).
- Homeworks and projects may be submitted late, but 10% of the points available for each 24 hours after the assignment was due will be deducted from late submissions. Email Dr. DeVan for access to submit HWs in Canvas 'quiz' format after the deadline.
- Late submissions (up to 10 days late) of journals will receive half credit.
- Review quizzes and exams cannot be completed late without documentation of an excusable absence from the [Office of the Dean of Students](#).
- Each student is expected to do their own work **independently**. (See Academic Dishonesty statement below.)
- Lectures may sometimes be recorded and shared with the class via canvas. These recordings will not be used beyond this semester.
- Compliance with current NJIT COVID-19 policies and other safety policies is required.
- All class communication will be to your NJIT email address – check your email regularly.

**Recitation Policies:** Recitation is an essential part of the course, in which you will meet in smaller groups to discuss class concepts and work together to solve biological problems. Recitation materials (available on Canvas) must be printed or downloaded to a laptop or tablet. A phone is not an acceptable format for viewing recitation materials. Your recitation instructor may have additional policies.

**Accessibility Statement:** Please let me know if you need accommodations for a disability. If you are in need of accommodations due to a disability please contact the Office of Accessibility Resources & Services (OARS), to discuss your specific needs: <https://www.njit.edu/accessibility/>

**Academic Dishonesty:** Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>. Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu).

## Learning Outcomes:

### A. Biological Principles

Students will....

1. Identify mechanisms of evolutionary change and explain how they lead to genetic change in populations through time.
2. Describe the structural characteristics of nucleotides (DNA/RNA) and explain how they are related to the functions of these molecules.
3. Identify the basic steps involved in gene expression and describe ways that gene expression can be regulated so that different cells produce different proteins.
4. Be able to transcribe information from DNA to RNA and to translate mRNA into amino acid sequences.
5. Interpret information depicted on a phylogenetic tree.
6. Outline the stages of cell division (mitosis and meiosis), explain what occurs during each stage, and describe how the nuclear DNA of daughter cells compares to that of the original cell.
7. Be able to utilize a Punnett square to predict the potential genotype/phenotype of offspring.
8. Define and give some examples of interspecific interactions and describe how different types of interactions affect the population sizes of the species involved.
9. Identify the different trophic levels in a community and explain how energy moves through them.
10. Explain traits related to an organism's life history and what influences the evolution of different life history strategies.

### B. Learning, Reasoning, and Problem-Solving Skills

1. **Learning How to Learn**
  - Students will develop personal learning strategies based on recognition of their own learning processes.
  - Students will identify their learning style and develop a learning plan that is aligned with that style.
  - Students will reflect on the note taking and study process and self-monitor their habits throughout the semester
  - Students will develop a plan for their continued learning beyond this course.
2. **Application**
  - Students will develop hypotheses to explain observed phenomena.
  - Students will design a basic experiment to test a hypothesis, taking into account the ethical and methodological considerations for proper experimental design.
  - Students will read and evaluate data critically:
    - identify and describe patterns in raw data.
    - interpret statistical analysis of others' results.
    - draw conclusions based on graphical presentation of data.
  - Students will communicate scientific information effectively:
    - present source material without plagiarizing.
    - convey information in written and graphical form.
    - target delivery appropriately to the audience.
3. **Integration**
  - Students will synthesize ideas from multiple areas in order to develop complex concepts.
4. **Human Dimension**
  - Students will feel confident in their ability to apply knowledge to solve problems.
  - Students will cooperate with their peers to solve problems as part of a team.
  - Students will take responsibility for their learning process and academic success.
5. **Caring/Valuing**
  - Students will get excited about the value of course material within their personal and professional lives.
  - Students will commit to being a good learner in this course and beyond.

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## Assessment of Learning:

**Learning Journal** – At the same time each week, you will have an assigned prompt on Canvas asking you to reflect on your own learning and progress in the course, to which you must respond via your personal forum on Canvas. Only instructors can see your entries. Students earn 2 points for complete, thoughtful response to a learning journal, and can earn up to 20 points for this grade component. It is not necessary to complete the journal every week to earn full credit.

**Participation** – Participation comes from 2 sources: Lecture participation and Recitation Participation. Lecture participation (2/3 of participation score) will be assessed using iClicker questions. Each lecture will include at least a couple clicker questions. You must answer (correct or not) at least 80% of the questions to receive full credit for this component; lower response rates are scaled accordingly. Recitation participation (1/3 of participation score) will be earned by active participation during recitations. Students who contribute to recitation discussions in at least 10 recitations will receive full credit for recitation participation.

**Preparation** - Preparation for class includes reading and watching required materials BEFORE class. Preparing in advance of class will allow us to go more in depth on key topics and include more concept application practice in lectures and recitations. Assessment of preparation will primarily be through graded questions administered through SimUText as well as completion of ungraded questions for SimBio Tutorials and Labs and occasional pop quizzes in lectures. There will be Preparation assignments most weeks. These assignments will be due before class on Monday of each week. Grading of Preparation assignments is based upon completion, not correctness. You must complete (correct or not) at least 80% of the assignments to receive full credit for this component.

**Quizzes** – During the course, there will be 4 quizzes to assess your understanding of concepts that we have covered in class and your ability to apply that knowledge. These are intended to provide practice as part of your preparation for exams and to give you an opportunity to mark your progress. You will also take a required pre- and post-quiz that together will make-up an additional quiz score. Your lowest quiz score (excluding the pre- and post- quizzes) will be dropped. This means that there will be no make-ups for quizzes, even with a valid excuse.

**Homework** – Each week of the course there will be a homework assignment that will require slightly more in depth work on a topic and will provide practice in the application of course concepts. Assignments will be completed by submissions to Canvas or through SimUText (see required materials), indicated as “SimBio” in the course schedule below. Homework assignments will be discussed either during Recitation or in Lecture.

**Projects** – Science often requires pulling together information from multiple sources to arrive at an end result. The course will include two projects that consist of several components that build towards a final goal.

**Exams** – There will be two exams that cover the application and understanding of the material covered in the course. These exams will also require you to apply the skills that we have emphasized. See course schedule for exam dates.

**Course Grade:** Your grade for this course will be based on the components described above. You can choose how your grade is calculated by determining the weight of each grade component as a percentage of your total semester grade, within the given ranges. Your final grade will be the highest of two possible grades: the grade that results from your selected weight (Your %) or the one resulting from the standard weight (Standard %). You will choose your % selections halfway through the semester following the first exam. This process should help you assess your strengths and weaknesses in the course and determine a strong course of action for the remainder of the semester.

Grades will be determined by the higher of the final percentage of the possible points earned (as described above, rounded to a whole number), following the standard grade scale. Grades are not curved, and there is no individual extra credit.

\*You must earn a C or better in order to progress within the Biology major.

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Grading Scale:	
A	>90%
B+	85-89%
B	80-84%
C+	75-79%
C	70-74%
D	60-69%
F	<60%

Grade Component (Total Points)	% Range	Standard %	Your %
Learning journal (20 pts)	4-7%	5.6%	
Participation (30 pts)	7-9%	8.3%	
Preparation (10 pts)	2-4%	2.8%	
Quizzes (40 pts)	9-13%	11.1%	
Homework (60 pts)	14-21%	16.7%	
Projects (80 pts)	18-26%	22.2%	
Exams (120 pts)	27-38%	33.3%	

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**Schedule:** Dates listed by week. Lectures will meet twice every week (different rooms for Monday and Wednesday) and recitation will meet every week, unless otherwise noted. Please note that this is the proposed schedule and is subject to change. A more detailed schedule will be continually updated via the Canvas course site.

Dates	Week #	Lecture Topic	Recitation	Assignments/Notes
9/4	1	Mon - No Class (Labor Day) Wed - Intro: Syllabus, Class goals	Succeeding in College/ Discussion on Intelligence	Pre-course survey
9/11	2	Mon - What is Science? Wed – Experimentation/Graphing	Data Nuggets: Spiders	HW 1: Intelligence
9/18	3	Mon– What is Biology? Evolution Wed - Natural Selection/ Adaptation/Fitness	Selection - Finches	HW 2: SimBio: GraphSmarts - Urban Evolution
9/25	4	Mon – Viruses and Vaccines Wed – <b>Review Quiz 1</b> , DNA/RNA Discovery/Structure	Disease spread	HW 3: Finches
10/2	5	Mon– Transcription/RNA Processing Wed – Translation	Cystic Fibrosis	HW 4: SimBio - How Diseases Spread
10/9	6	Mon– Regulation of Gene Expression Wed – Epigenetics	Project 1 Epigenetics	Project 1, Part 1 HW 5: SimBio - Transcription & Translation Explored
10/16	7	Mon - <b>Review Quiz 2</b> , Mutation Wed – Phylogenetic Trees	Project 1 SARS	Project 1, Part 2 HW 6: SimBio - Gene Regulation
10/23	8	Mon– COVID-19 Wed - <b>Exam 1</b>	Project 1 Semester Progress Report	Project 1, Part 3 HW 7: SARS
10/30	9	Mon - Scientific Writing Wed – DFTD	DFTD	
11/6	10	Mon – Cell Cycle/DNA Replication Wed – Mitosis	Primer Design	Project 1, Part 4 HW 8: SimBio - Mitosis
11/13	11	Mon - Cancer Wed – Meiosis/Mendelian Inheritance	Project 2 Genes and Cancer	Project 2, Part 1 HW 9: SimBio - DNA Explored
11/20	12	Mon - Inheritance Wed - No class - Thanksgiving!	NO Recitations	WED 11/22 – NJIT on FRI schedule
11/27	13	Mon - <b>Review Quiz 3</b> , Population Genetics Wed - Interactions / Competition	Project 2 Pedigrees	Project 2, Part 2 HW 10: SimBio - Meiosis
12/4	14	Mon – Mutualism/Predation Wed – Food Webs	Project 2 Tasmanian Food Web	Project 2, Part 3 HW 11: Pedigrees
12/11	15	Mon - <b>Review Quiz 4</b> , Life History Strategies	NO Recitations	Project 2, Part 4

		Wed – Future for Tasmanian Devils		HW 12: SimBio: GraphSmarts - Cancer Biology
12/17-12/23		Exam 2 - During Final Exam Period*		Final Exam Schedule will be posted here: <a href="http://www.njit.edu/registrar/exams">http://www.njit.edu/registrar/exams</a>

\* Do not schedule travel during the final exam period until after the NJIT final exam schedule has been announced.

## Succeeding in Concepts in Biology

Learning is an active process, and it requires actively thinking, discussing and writing. Being successful at this process necessitates you understanding how you best learn biology. That requires thinking about more than just what you are learning, but how you are learning it. This is referred to as metacognition. Practicing this process will make you more efficient learners and better able to learn and integrate new material. We want you to do well in this course. In fact, we want to help you develop skills in this course that will help you do well in every course you take from this point forward. So, don't treat these things as a chore you just have to do for this course. These are all suggestions that can be helpful in any class that you take.

1. **Be Present.** It's important to "show up" to class. Limit your distractions, be prepared to take notes, and be active in your participation with the class. Engagement in class activities means that you will learn more and struggle less when you work on your own later.
2. **Be Proactive.** This applies to a number of contexts. For example, cramming for an exam is something that many students do, and sometimes it even feels vaguely successful –especially when memorization of something for short-term recall is the goal. Memorization of facts is not the point of this course though, so that strategy is even less likely to work here. Being proactive also means that you need to think about how you are doing and make an effort to improve. In other words, don't wait until you see your final grade posted online to care about how you are doing in the course.
3. **Talk.** Talking through an idea can help with your understanding. Discussion will be a big part of this course, so we will encourage your active discussion during lecture and recitation. But, talking things through shouldn't end when you walk out of class. Form study groups, meet virtually, and talk about the class.
4. **Use the Learning Outcomes.** I have provided the overall goals for you just above this section and will include more specific ones throughout the semester. These are posted for your benefit to help guide your studying and illustrate key ideas and skills you should work to master.
5. **Test Yourself.** Take some time to think about the material that has been covered in class. Potentially, ask yourself (or your classmates) questions like:
  - What were the main topics from this class session? (Objectives? Questions?)
  - What do I need to know in order to understand that concept, question or problem?
  - Can I break the topic into smaller parts? What parts can I explain in a manner that makes sense to me?
  - What parts are unclear or don't make sense yet?
  - How does today's class session relate to the larger goals of the course?

Clues to the answers to several of these questions will be found in the specific learning outcomes emphasized for each class/topic.



Your classroom as well as your college experience is meant to be a place where the free flow of ideas is encouraged and nurtured. It is not acceptable for any community member to make hurtful and demeaning remarks, or otherwise disrupt your learning experiences or your safety. As such, there are many NJIT support systems and policies of which you should be aware.

<p><b>Basic Needs</b></p> <p>Students who face challenges securing their food or a safe and stable place to stay are urged to contact the Dean of Students (dos@njit.edu). If you are comfortable doing so, please notify me as well.</p> <p><u>Food Insecurity</u>: If you are experiencing food insecurity, there is a food pantry on campus for your convenience (You must bring your UCID). Campus Center, Room 478 <a href="mailto:foodpantry@njit.edu">foodpantry@njit.edu</a> See website for updated hours: <a href="https://www.njit.edu/foodpantry/hours-and-general-information">https://www.njit.edu/foodpantry/hours-and-general-information</a></p> <p><b>Student Parents</b></p> <p>If circumstances arise that necessitate your absence from class - such as the illness of a child, closing of day care for inclement weather, etc. - please contact me as soon as possible so we may make arrangements to keep you up-to-date with course material and activities. If you should need any other kind of assistance for circumstances relating to your status as a student and parent, please consider contacting the Dean of Students and Campus Life at 973.596.3466 for a referral to appropriate services including on and off campus support.</p>	<p><b>Emergency Support</b></p> <p><u>Crises Happen</u>: If you experience a life emergency and are unsure which support services to turn to, NJIT Public Safety can connect you to emergency support systems - call 973.596.3111.</p> <p>For medical, psychological or psychiatric emergencies you can also call: University Hospital Crisis 973.623.2323</p> <p>If you want to report a concern about another students' well-being you can also reach out to the NJIT CARE Team (<a href="https://www.njit.edu/care/">https://www.njit.edu/care/</a>) or the Dean of Students Office.</p> <p><b>Consensual, Healthy Personal &amp; Professional Relationships</b></p> <p>Your body is your own and NJIT strives to protect its community members from any unwanted advances. Title IX prohibits discrimination based on sex, including harassment, domestic and dating violence, sexual assault, and stalking. Sexual violence undermines students' academic success. Anyone dealing with sexual misconduct should consider talking to someone about their experience, so he/she/they can get the support needed.</p> <p><b>Confidential Resource:</b></p> <ul style="list-style-type: none"> <li>• <u>Center for Counseling and Psychological Services (C-CAPS)</u> Campbell Hall, Room 205 (Main Level)   973.596.3414</li> </ul> <p><b>Non-Confidential Resources:</b></p> <ul style="list-style-type: none"> <li>• <u>NJIT Public Safety</u> 973.596.3111</li> <li>• <u>Dean of Students Office</u>, 255 Campus Center   973.596.3466</li> </ul>	<p><b>Mental Health and Stress Management</b></p> <p>Center for Counseling and Psychological Services (C-CAPS) is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. <a href="https://www.njit.edu/counseling/gethelp">https://www.njit.edu/counseling/gethelp</a></p> <p>Diminished mental health, including significant stress, mood changes, excessive worry, or problems with eating and/or sleeping can interfere with optimal academic performance. The source of symptoms might be related to your course work; if so, please speak with me. However, problems with relationships, family worries, loss, or a personal struggle or crisis can also contribute to decreased academic performance. Please seek out help as needed.</p> <p>Campbell Hall, Room 205 (Main Level)   973.596.3414</p> <p><b>Special Accommodations</b></p> <p>If you have a disability or a personal circumstance that will affect your learning in this course, please let me know as soon as possible so that we can discuss the best ways to meet your needs. Any student who needs accommodation for disabilities should also contact the Office of Accessibility Resources and Services (OARS): <a href="https://www.njit.edu/studentssuccess/accessibility">https://www.njit.edu/studentssuccess/accessibility</a></p> <p>Kupfrian Hall, Room 201973.596.5417   <a href="mailto:oars@njit.edu">oars@njit.edu</a></p> <p><b>Religious/Cultural Observance</b> Students who have religious or cultural observances that coincide with this class should let me know by email within the first two weeks of class. I strongly encourage you to honor your cultural and religious holidays! However, if I do not hear from you within the first two weeks, I will assume that you plan to attend all class meetings.</p> <p><b>Supporting Academic Integrity</b> Our community functions best when its members treat one another with honesty, fairness, respect, and trust. The college promotes the assumption of personal responsibility and integrity, and prohibits all forms of academic dishonesty and misconduct.</p> <p><b>Issues of Concern (Non-Emergency)</b></p> <p>Alert the Dean of Students Office (dos@njit.edu) about issues of concern, including academic and non-academic violations (<a href="https://www5.njit.edu/doss/reporting/">https://www5.njit.edu/doss/reporting/</a>).</p>
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