

# Syllabus/Schedule for Biology 101: Fall 2016

## Principles of Biology (Section 001)

T/Th 9:30-10:45; GSB 100

**Instructor:** Dr. Kelly Hogan

[leek@email.unc.edu](mailto:leek@email.unc.edu); Office phone: 843-6047, Wilson Hall room 104B

**Supplemental Instruction TAs:**

Jeliah Clark ([clarkjs@email.unc.edu](mailto:clarkjs@email.unc.edu))

Chase Brandner ([chaseb@email.unc.edu](mailto:chaseb@email.unc.edu))

\*SI times/locations: TBA (see Sakai for information)

**Peer mentors:** Please see Sakai homepage

**Learning Center Biology Specialist:** Robin Blanton ([rcb@email.unc.edu](mailto:rcb@email.unc.edu))

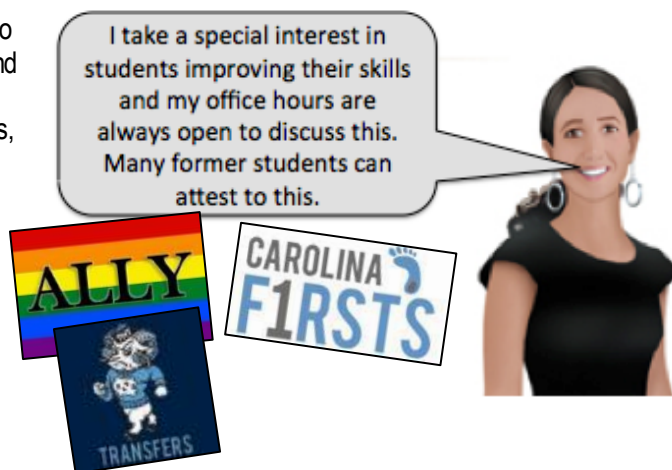
Biology 101 is an introduction to biology at the college level that is intended to serve both majors and non-majors. It is assumed that students in this class do not have a great deal of practice with biology and that any prior experience is likely to be several years ago. Biol 101 students are expected to take a very active role in their learning by completing readings and homework before class, coming to class ready to participate directly with peers and through in-class technology, and reviewing routinely for quizzes and exams. In this highly structured course, *we have evidence that every student can achieve if they are motivated to be an active learner!*

**OFFICE HOURS:** Don't feel intimidated if you've never been to a professor's office hours. You can come alone or sign-up with a friend. You can come in to talk about the course, study skills, mental health issues, your background, your career, advice for future courses to take, etc. I'm a Carolina First advocate, safe-zone trained (LGBTQ), and an advocate for Covenant students, Chancellor Science Scholars, transfer students, international students, continuing education students, underrepresented minority students, first year students, sophomores, students with silent and physical disabilities, students that require oxygen...ANY student!

Check "Sign-up" tool on Sakai menu to reserve a slot (and for any last minute additions/deletions to my hours for each week). My hours for each week will generally be:

- Mondays 3:00-5:00
- Thursdays 2:15-3:15 pm

*(Come alone or with a friend. I may add hours some weeks as my schedule allows or see individuals outside of these hours if necessary; walk-ins welcome but may need to wait. If you can't make these hours, we can schedule a time.)*



**Peer support via PIAZZA:** I'll have hundreds of students this semester and know I cannot give you all the individual attention you deserve. I'll ask that you become a community of scholars to help answer questions about the course logistics and course content. Piazza is a tool that will help us do this and will help you find study buddies. I and the S.I. TAs, and course mentors will be checking in through Piazza occasionally, but it is expected that you will answer each other's questions. I'll be taking notice of students who are engaging here. Sign up here for free immediately at: [piazza.com/unc/fall2016/biol101](http://piazza.com/unc/fall2016/biol101)

**SUPPLEMENTAL INSTRUCTION (SI):** Your SI sessions will be offered 3-4 times a week. Each session will be scheduled for 1 hour. The times and location of these sessions will be posted on Sakai in the second week of class. You are not required to attend SI, but it is highly recommended, since this is your opportunity to get more “one-on-one” attention for this course. Plus, we have data that suggests students that attend score on average half a grade better than peers who don’t attend. I suggest you fit one into your schedule early in the semester and attend weekly as if it is a required class. Your SI instructors’ contact information is listed above.



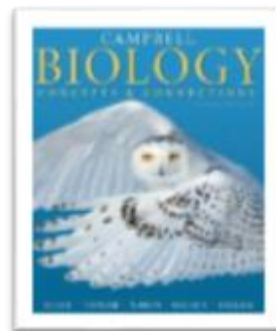
**Peer Mentors:** We’ll have several peer mentors helping in class as we work on activities. Peer mentors are folks you can call over for help during class and meet up with outside of class. See Sakai for more information about each mentor’s contacts and hours outside of class.

**Bio Cell with Biology Specialist:** Feel you need a more basic review and more in-depth help? Attend these weekly sessions sponsored by the Learning Center.

## REQUIRED TEXT AND REQUIRED ONLINE MODIFIED MASTERING BIOLOGY ACCESS with ebook:

Campbell Biology, Concepts and Connections, 8th Edition by Reece, et al.

You are required to have the package with the ebook. You are NOT required to have a hard copy of the textbook on top of that. Having a hard-copy of the textbook is your choice. Please see Sakai for details about the different packages so you can spend your money most wisely. (Immediate, free temporary access is available online if you are waiting for a package to arrive.) If you do not purchase materials via the UNC bookstore pay EXTRA CLOSE attention to the materials you must purchase on your own. Note: there are several hard-copy books on reserve at the Undergraduate Library.



**Required reading:** Particular chapters are required (see Guided Reading Questions (GRQs) for specific details).

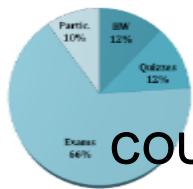
*Question:* Should you read and answer the GRQs before or after completing Mastering Biology homework assignments? Answer: BEFORE!

## WHAT YOU SHOULD BRING TO CLASS EVERY DAY:

1. **Completed Guided Reading Questions (GRQs)** that you finished before class and can use as a reference. Find these posted on Sakai.
2. **Blank Outlines** (printed that you can hand-write on). *Note: educational research shows that students learn more by handwriting notes, despite how convenient we all feel a laptop is!*
3. **Extra blank paper for drawings, notes, activities etc.** (or tablet computer for drawing)
4. **3 x 5 index cards to turn in to me during activities** (with or without lines, preferably white).
5. **A smart-device:** enabled for UNC wi-fi and Learning Catalytics access. I prefer you use a smart phone for ease, but a laptop or tablet will work too.

Note: You may NOT rely on cellular service. you must have your device connected to UNC-Wifi—be sure to do this for any devices you might use in class before the first day: <http://help.unc.edu/help/connecting-to-the-unc-network-getting-started/>





## COURSE COMPONENTS MAKING UP FINAL GRADE:

### HOMEWORK VIA MASTERING BIOLOGY:

**(12% of your grade).** Homeworks will be due generally every Monday and Wednesday night by 11:55 PM (see detailed schedule). Some assignments will take you as little as 20 minutes and others will take over an hour with the animations and short tutorials interspersed in the homework. **It is your responsibility to start it in a timely fashion, so that you finish it by 11:55 PM.** Late homeworks will receive zero credit, even though you can still do them for practice. See my Goal #1 below and realize that I am trying to *help* you to succeed by giving you these regular assessments. Assignments post about one week before they are due. *Note: These questions are often lower level and not equivalent to exam questions.* They are meant to help you learn/practice.

### QUIZZES VIA MASTERING BIOLOGY: (12% of your grade).

You will be required to do online timed quizzes in Mastering Biology (MB Quizzes). These are meant to give you practice for answering questions in a timed situation, more predictive of how you might do on an exam than a typical HW. Missed quizzes = 0%. *Unlike other assignments, quizzes post only about 3 days before they are due.* Note: You must complete once started and you cannot go backwards on these questions. Students registered with ARS may need to contact the professor if accommodations are necessary.

### Register for Mastering at:

[www.pearsonmylabandmastering.com](http://www.pearsonmylabandmastering.com) with—see Sakai for course code and more details about temporary access.

**PARTICIPATION VIA LEARNING CATALYTICS (10% of your grade):** Most of this grade will come from Learning Catalytics, but completion of surveys and in class assignments may also be a part of this grade. Are you required to come to class? Are you required to pay attention? Are you required to discuss biology with your classmates during class? Nope, I cannot *make* you do any this. This is your education and you want to be a successful UNC student. I enjoy Snapchat too, but please put it away and participate in your education! To participate, we'll use Learning Catalytics (accessed through Mastering Biology) through your smart device. *Note: these questions are to be done in class, you will receive a zero on this portion of your final grade if you are found to be answering questions from a distant location.*

*How is LC graded?* Many questions will be participation only. Some questions throughout the semester will be graded as correct/incorrect based on Guided Reading Questions and Team Based Review Days. Thus it behooves you to not only come to class but to also work to get correct answers. A few points will be dropped for all students to accommodate occasional absence, tech problems, athletic travel, lateness, etc. Please do not email me to tell me you were absent, we will have so many opportunities for participation that missing one or two days in the semester will not affect your grade (I will end up dropping a few points for every student to make accommodations for this for ALL students). If you have many excused absences due to extended illness, let me know. Thanks.

**INDIVIDUAL EXAMS (66% of final grade):** There will be three traditional exams given during the regular semester, and a cumulative final exam. The format will be multiple choice, so bring two #2 pencils to the exam. Only the final exam is cumulative. Each semester exam will only cover the material specified on the course schedule. For all exams, you will need your PID number as identification on your exam sheet. Additionally, you may be asked to verify your identity, so it is required that you bring your one-card to each exam. Failure to produce a One-Card if asked may result in a zero on that exam. Students who use ARS: I will upload the file and ask that you return the exam to my office, if you are able.

**THERE ARE NO MAKE-UP EXAMS GIVEN.** Only two of the three semester exams are used in your final grade. Thus, if you miss one exam due to athletics, family issues, medical reasons, I do not need to know about it (but hold onto your excused paperwork in case it is needed later in the semester!) If you miss two exams, and have sanctioned excuses for missing both exams, please contact the professor. Make-up exams will not be identical to the class exam.

## OTHER COURSE COMPONENTS

### Weekly Email Survey:

We will email you a survey each week as part of a research project on how to improve your learning experience in Biology 101. We gather information from a variety of sources and in the survey we ask you about study habits, expectations, and time commitments. Please answer these surveys carefully and honestly. You should receive the first survey in your UNC email before classes begin.

Once you have completed the first survey, we will email the weekly survey to you each **Wednesday at noon** and you will have **until Friday at 11:59pm to complete** it before the link closes. In exchange for your time, we will be randomly rewarding 7 students in your class with \$50 Visa gift cards. You will have an additional entry in the drawing for each survey you complete.



The first survey takes no more than 15 minutes to complete and the rest take 5 minutes each to complete.

For anyone worried about survey responses affecting course grades, or my opinion of you, there are many reasons not to worry.

(1) Your answers will be kept confidential. I will not see your responses. TAs will not see your responses.

Other students will not see your responses.

(2) Your answers will in no way affect your course grade.

(3) An Economics PhD student I am working with, Zach Mozenter, will be analyzing the data, not me.

(4) Zach will not be analyzing the data until after final grades are finalized.

(5) We are interested in the average trends in the class as a whole, not any one person's responses.

(6) Even if we wanted to look at an individual's responses, we cannot, since we will remove identifying information (such as names or PID) from the data before analysis.

More information about the project will be provided during the first week of class.

**\*\*Direct all questions about the surveys to Zach Mozenter. His email is [zmozent@live.unc.edu](mailto:zmozent@live.unc.edu)**

## HOW IS YOUR GRADE DETERMINED?



If you take all three semester examinations:

**The lowest exam grade is dropped** and the total for the semester =  
 $(0.22 \times \text{exam}) + (0.22 \times \text{exam}) + (0.22 \times \text{final exam}) + (0.12 \text{ homework average}) + (0.10 \text{ participation score}) + (0.12 \text{ quiz score})$

If you take any two semester exams:

Both the exams you took will count and the total for the semester =  
 $(0.22 \times \text{exam}) + (0.22 \times \text{exam}) + (0.22 \times \text{final exam}) + (0.12 \text{ homework average}) + (0.10 \text{ participation score}) + (0.12 \text{ quiz score})$

### ***Converting your final average to a letter grade:***

A = or greater than: 93

A- = or greater than: 90

B+ = or greater than: 87

B = or greater than: 83

B- = or greater than: 80

C+ = or greater than: 77

C = or greater than: 73

C- = or greater than: 70

D = or greater than: 60

F is less than: 60 (or a score of 45% or less on the final exam)

*(Note: there will be no changes to HOW your final average is calculated at the end of the semester...so please don't ask!)*



**STUDENT CONCERNS:** Many students like to complain that Biol 101 is a “weed out” course. Of course this is not true, but why does it have this reputation? Fact: the average grade in this class is in the C+/B- range; this is not *bad*-- it is *average*. Yet, students also earn D's and F's in this class. This is absolutely shocking to first year students who have, in the past, received A's in their high school classes for memorizing course material. You are wondering...is there a pre-determined number of students that receive a C, D, or F? Nope. In theory, if the whole class earns A's, then the whole class is given A's. So why don't all students do as well as they think they will when they walk into class on the first day? My experience tells me that:

- 1) Some students do not have the active learning and studying skills that they should already have at the college level (It often takes these students an exam or two for them to recognize this.) We can fix this together.
- 2) Some students do not actually put in the effort that is necessary (even though they may *think* they are putting in a big effort). You can fix this if you are honest with yourself.

## A FEW OTHER NOTES:

### DIGITAL ETIQUETTE

This course will require you to use your laptop and/or cell phone during class time. While I recognize that you are an excellent multi-tasker, research suggests that your peers are not. Please be respectful of your classmates and restrict your use of digital devices to course content. If we see that you or your peers are distracted, we will ask you to put your devices away or move you to the atrium, and you may forfeit your ability to earn participation points that day. There will be times when you have completed your work or answered a poll question, but your peers have not. We ask that you assist your peers when appropriate or use the time to review your notes while you wait. I understand that your devices connect you to your friends and family (a wonderful thing!) but the classroom should be a place apart, however briefly (even if it seems like an eternity to you), from the outside world and distractions. You will learn more if you concentrate on the course while you are here and your classmates will thank you for not impeding their ability to learn.

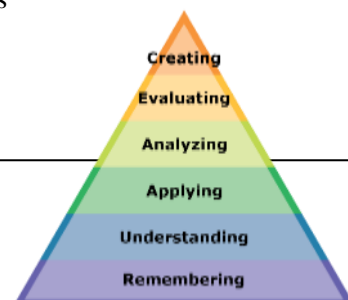
Should you take notes by hand or on the laptop? Research suggests taking notes by hand is the way to go! You will have class outlines that you should print before class and write and draw on. Much of biology is about drawing, so a laptop just won't be useful. Ideally, you will use your smartphone if you have one for Learning Catalytics and not bring a laptop. Powerpoints will only be posted after class.

**SAKAI SITE** (you will need your onyen to log on)  
This site will have postings from my lectures such as outlines, power point slides, and supplemental material I mention in lecture. I will also post announcements/send emails regarding student concerns on this site. *It is your responsibility to check it and your UNC email account daily for any course announcements.*  
be posted after class.

## COURSE GOALS:

**1. This course should prepare you to succeed in future science courses. You should learn how to be an active learner in the lecture hall and you should learn how to actively study.** Educational research has shown that students in this course who do reading/ homeworks before class, actively participate in class, and review notes regularly can and will succeed. Feeling underprepared because of your background? The course is designed to equalize your readiness before class—while you may take several hours reading and preparing, another student may need less time. Yet when you get to class, your effort will pay off as we practice these concepts together and you gain confidence in your ability! How do you know you are learning? When you make mistakes and identify what you don't know. **Making mistakes is KEY to learning.** It makes more sense to make mistakes on homeworks and in-class when the stakes are very low, rather than on an exam, right?

And what if you don't plan to take any more science classes? Active learning and studying are skills needed for any discipline. You can achieve these goals through practice. Most students enter college very skilled at remembering and understanding (Regurgitating memorized information.) True learning will take place, when you are challenged to apply, analyze, evaluate, and synthesize. I will challenge you to do this. You might find this difficult and uncomfortable, but you will be learning!



## 2. This course should provide you with the concepts and skills that make up the scientific field of biology.

For those of you continuing in biology, this is just the tip of the iceberg. For others, this might be your one and only biology course! Our goal will be to touch upon many topics, finding common themes in the chapters we cover. Thoroughly learning the principles is about making connections between material learned at the beginning, middle, and end of the semester! Practice is key to building a foundation of knowledge (and that is why you do Guided Reading notes, Mastering Biology, in-class activities, quizzes, SI, etc.).

Specifically, by the end of the semester you should be able to:

- Identify examples and name **FIVE** core themes of biology
- Evaluate a scientific study and determine if its design is sound so as to evaluate science around vaccines, pseudoscience, etc.
- Make conclusions from data and draw graphs and models from data/information given to you.
- Describe the new properties that emerge at each level of hierarchy of life (from small organic molecules through ecosystems and some ways these systems are kept in balance.
- Explain what “food” is and compare and contrast animals and plants in how they obtain and transform the matter and energy.
- Describe the flow of information in various signaling pathways and in the flow from DNA to proteins.
- Explain how life on earth evolved and how adaptations relate to survival, reproduction, and intra- and inter-specific interactions.
  - Detail examples of adaptations in the animal body in which “structure fits function” at the cellular and whole body level.



**3. This course should excite you about biology.** Throughout the semester I hope you will ask yourself *and me*, why is this relevant to me? Some lessons will be more obvious as they relate to health and medicine. I hope that the biology that we learn this semester will cause you to ask more questions. You might even leave with more questions than answers! I'll continually encourage you to read about biological issues and advances in the popular media. If I succeed in getting you to read some articles on your own, I will be a happy professor!

I believe students thrive when they:

- Take full advantage of the breadth and depth of our curriculum
- Set academic and personal goals
- Take responsibility for their education, choices, & decisions

**How will you THRIVE this semester?**



How *successful* students have done well in this course: They...

1. always read the textbook for each corresponding homework while answering Guided Reading Questions (GRQs). They pay attention to what they are reading and reflect on what they are unsure about. They do NOT spend time making their own extensive outlines, they use the GRQs only.
2. complete their Mastering Biology homework assignments with plenty of time to make mistakes and think through the questions. They are not too focused on the grade they get on homeworks because they value the homeworks and videos as a tool to learn.
3. attend each class session prepared, stay engaged by hand-writing notes, and sit with peers that encourage them to participate and learn. (They move seats to find the peers they best learn from—not necessarily their friends.)



4. are brave and vulnerable. What do I mean? They are willing to make mistakes, take chances drawing a model wrong, are willing to attempt questions by themselves before checking in with a peer, are willing to talk to a classmate they don't know.
5. review after each class for about 15-20 minutes to reflect on what was learned and what they still have questions about.
6. study before each Mastering Biology quiz, so as to prepare for them like a practice test.
7. review (on their own) every question from Mastering HW, GRQs, Quizzes, Learning catalytics, class, etc to see if they could TEACH it to someone else. Successful students don't just simply get the right answer and move on, they are able to explain how someone arrives at this answer.
8. attend S.I., mentoring hours, tutoring hours, or study groups routinely because once they have done the work alone, they can collaborate and learn even more from others. (They use Piazza and class time to meet peers.)
9. have a system for planning and keeping track of all deadlines.
10. are able to state what resources are available and where to find them.

### KNOW YOUR RESOURCES:

Assignments/schedule are on the following pages. All hours/locations for office hours, S.I., mentoring, tutoring etc. will be posted on the front page of Sakai. Changes will be sent out via announcements. All materials you need (GRQs, outlines, powerpoints, old exams) are found in the resources folder of Sakai.

Reach me through office hours, after class, or by email. I am a really nice person...nobody to be scared of!! Come see me after the first exam if you did not do well. What suggestions can I have for you if you wait until you did poorly on all three exams?



**How to prepare for an exam?** Use GRQs, class outlines, Learning Catalytics questions, Power Point slides. Be able to explain, draw, compare etc. (See following page with ideas about how you demonstrate you know something.) READING is NOT studying. Studying involves blank paper, explanations, drawings, etc. Don't forget the importance of sleep before an exam!

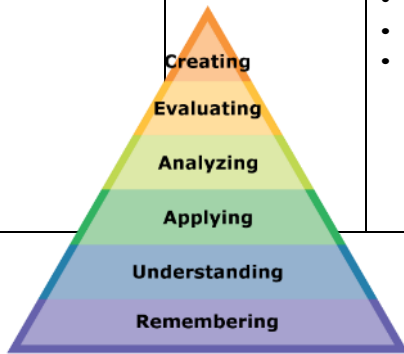
**Uphold the honor code.** Academic integrity is at the heart of Carolina and we all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system. Your full participation and observance of the Honor Code is expected, including reporting others to me.

## Action Verbs: Words to implement in your studying

When studying, try drawing, contrasting, arranging, etc.

Type (Level)	Knowledge (1)	Comprehension (1)	Application (2)	Analysis (3)	Synthesis (3)	Evaluation (3)
<b>Bloom's Definition</b>	Remember previously learned information.	Demonstrate an understanding of the facts.	Apply knowledge to actual situations.	Break down objects or ideas into simpler parts and find evidence to support generalizations.	Compile component ideas into a new whole or propose alternative solutions.	Make and defend judgments based on internal evidence or external criteria.

<b>Verbs</b>	<ul style="list-style-type: none"> <li>• Arrange</li> <li>• Define</li> <li>• Describe</li> <li>• Duplicate</li> <li>• Identify</li> <li>• Label</li> <li>• List</li> <li>• Match</li> <li>• Memorize</li> <li>• Name</li> <li>• Order</li> <li>• Outline</li> <li>• Recognize</li> <li>• Relate</li> <li>• Recall</li> <li>• Repeat</li> <li>• Reproduce</li> <li>• Select</li> <li>• State</li> </ul>	<ul style="list-style-type: none"> <li>• Classify</li> <li>• Convert</li> <li>• Defend</li> <li>• Describe</li> <li>• Discuss</li> <li>• Distinguish</li> <li>• Estimate</li> <li>• Explain</li> <li>• Express</li> <li>• Extend</li> <li>• Generalized</li> <li>• Give example(s)</li> <li>• Identify</li> <li>• Indicate</li> <li>• Infer</li> <li>• Locate</li> <li>• Paraphrase</li> <li>• Predict</li> <li>• Recognize</li> <li>• Rewrite</li> <li>• Review</li> <li>• Select</li> <li>• Summarize</li> <li>• Translate</li> </ul>	<ul style="list-style-type: none"> <li>• Apply</li> <li>• Change</li> <li>• Choose</li> <li>• Compute</li> <li>• Demonstrate</li> <li>• Discover</li> <li>• Dramatize</li> <li>• Employ</li> <li>• Illustrate</li> <li>• Interpret</li> <li>• Manipulate</li> <li>• Modify</li> <li>• Operate</li> <li>• Practice</li> <li>• Predict</li> <li>• Prepare</li> <li>• Produce</li> <li>• Relate</li> <li>• Schedule</li> <li>• Show</li> <li>• Sketch</li> <li>• Solve</li> <li>• Use</li> <li>• Write</li> </ul>	<ul style="list-style-type: none"> <li>• Analyze</li> <li>• Appraise</li> <li>• Breakdown</li> <li>• Calculate</li> <li>• Categorize</li> <li>• Compare</li> <li>• Contrast</li> <li>• Criticize</li> <li>• Diagram</li> <li>• Differentiate</li> <li>• Discriminate</li> <li>• Distinguish</li> <li>• Examine</li> <li>• Experiment</li> <li>• Identify</li> <li>• Illustrate</li> <li>• Infer</li> <li>• Model</li> <li>• Outline</li> <li>• Point out</li> <li>• Question</li> <li>• Relate</li> <li>• Select</li> <li>• Separate</li> <li>• Subdivide</li> <li>• Test</li> </ul>	<ul style="list-style-type: none"> <li>• Arrange</li> <li>• Assemble</li> <li>• Categorize</li> <li>• Collect</li> <li>• Combine</li> <li>• Comply</li> <li>• Compose</li> <li>• Construct</li> <li>• Create</li> <li>• Design</li> <li>• Develop</li> <li>• Devise</li> <li>• Explain</li> <li>• Formulate</li> <li>• Generate</li> <li>• Plan</li> <li>• Prepare</li> <li>• Rearrange</li> <li>• Reconstruct</li> <li>• Relate</li> <li>• Reorganize</li> <li>• Revise</li> <li>• Rewrite</li> <li>• Set up</li> <li>• Summarize</li> <li>• Synthesize</li> <li>• Tell</li> <li>• Write</li> </ul>	<ul style="list-style-type: none"> <li>• Appraise</li> <li>• Argue</li> <li>• Assess</li> <li>• Attach</li> <li>• Choose</li> <li>• Compare</li> <li>• Conclude</li> <li>• Contrast</li> <li>• Defend</li> <li>• Describe</li> <li>• Discriminate</li> <li>• Estimate</li> <li>• Evaluate</li> <li>• Explain</li> <li>• Judge</li> <li>• Justify</li> <li>• Interpret</li> <li>• Relate</li> <li>• Predict</li> <li>• Rate</li> <li>• Select</li> <li>• Summarize</li> <li>• Support</li> <li>• Value</li> </ul>
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What kinds of questions do you have trouble with on quizzes/exams?  
Knowledge or application? Practice what you have trouble with.

## Course Schedule/Topics for Discussion\*

For each assignment, you have a “Guided Reading Assignment (GRQ)” with the same title that you should do **before** doing Mastering Homework. (See each GRQs for the specific pages to read from the text, etc).

The idea is that Mastering will reinforce what you have independently learned from the reading. If you simply hunt and peck through the text to find the answers without doing the reading, you are missing a large chunk of information I expect you to be familiar with. You are ultimately responsible for information in “Guided Reading” as if these are lectures. Not doing these = missing at least a third or one-half of the course content. Due dates are subject to change (such as with weather) but it is VERY unlikely exam dates would ever change.

*Homework assignments are shown in red. **Late homework assignments = 0%***

<u>Date</u>	<u>Topic</u>	<u>In-class Objectives (tip: use these to study too)</u>
<u>WEEK 1</u>		
<i>Before first class, complete first email survey.</i>		
Tues Aug 23	Introduction and Pre-test	Describe course components and make introductions. (Bring a #2 pencil and scantron—purchase at student stores)
<i>Due Wednesday by 11:55 PM: *Guided Reading Qs (GRQs) + Two Mastering assignments:</i>		
<i>1) Introduction to Mastering and</i>		
<i>2) Exploring Life and the Process of Science</i>		
<i>*Note: Guided Reading Questions are not turned in.</i>		
<i>Don't forget to print your Class Outlines and bring to class!! Do week 1 email survey too.</i>		
Thurs Aug 25	The process of Science	Distinguish science from unjustified claims and explain how science is iterative. Describe elements of research design and how they impact scientific findings/conclusions (e.g. identify strengths and weaknesses in research related to bias, sample size, randomization, experimental control) Formulate a testable hypothesis and design a controlled experiment.
<b>--UNIT 1 BIOCHEMISTRY &amp; CELL BIOLOGY--</b>		
<u>WEEK 2</u>		
<i>Due Monday (by 11:55 PM): GRQs + Macromolecules (on Mastering)</i>		
Tues Aug 30	Macromolecules	Classify polysaccharides based on their structure/function in plants and animals and describe how monomers join to form them. Define lipids and explain their functions and properties in polar or non-polar solvents. Draw protein structure and depict the consequence of mutations on normal structure and function. Explain the molecular forces that hold protein structure together and how they can be disrupted. Identify how the human body uses macromolecules from food.
<i>Due Wednesday: GRQs + A tour of the Cell (on Mastering); Do week 2 email survey too.</i>		
Thurs Sep 1	Macro cont. & A Tour of the cell	Predict structures of the prokaryotic cell that would be antibiotic targets. Describe how a protein is synthesized and exported from a cell how disease can be caused when this process goes awry. Explain how insulin-producing cells are like dysfunctional factories when a person is diabetic.

### WEEK 3

*Due Monday by 11:55PM: MB Quiz 1\* (timed) (do quiz and then GRQS + Structure and Function of Membranes)*

*\*Note: Unlike assignments which are posted ~week before their due date, quizzes only post 3 days before they are due. Plan accordingly..*

Tues Sep 6	Cell cont. & Membranes	Interpret experiments about protein production and make conclusions about why protein production is impaired in cystic fibrosis. Categorize molecules that cross membranes freely and those that do not. Discriminate between passive transport, active transport, and bulk transport of molecules across a membrane.
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*Due Wednesday: GRQs+ Cell signaling via hormones Do week 3 email survey too.*

Thurs Sep 8	Membranes cont. & Hormones	Predict how water will move via osmosis and explain why this is critical to your cells. Describe how the two types of chemical signaling mechanisms affecting target cells differently. Apply the two mechanisms of chemical signaling to insulin signaling and sex hormone signaling.
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### WEEK 4

*Due Monday: GRQs + Energy and Enzymes and Cellular Respiration*

Tues Sep 13	Energy /Enzymes/Respiration	Explain the importance of enzymes in metabolism and how they are inhibited. Explain how ATP does work. List the inputs and outputs of aerobic cellular respiration and describe the big picture for why cells use this process. Explain how coenzymes are reduced during respiration and how this contributes to ATP formation. Describe big picture of cellular respiration
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*Due Wednesday: MB Quiz 2 first (timed) and then GRQs and Cellular Respiration; Do week 4 email survey too.*

Thurs Sep 15	Cellular Respiration	Diagram the major stages of aerobic respiration, noting the location in the cell and the inputs and outputs of each stage. Explain how a H <sup>+</sup> gradient and oxygen are both necessary for oxidative phosphorylation. Describe anaerobic respiration pathways and differentiate them from aerobic pathways.
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### WEEK 5

*Due Monday: GRQs +Photosynthesis*

Tues Sep 20	Photosynthesis	Describe where the mass of a tree comes from and explain how the "mass" is made. Explain how trees are carbon sinks. Describe the two parts of photosynthesis and the inputs and outputs of both parts. Explain what kind of sunlight is used by the plant and why sunlight is necessary. Explain photophosphorylation in the light reactions of photosynthesis, and describe how photophosphorylation is similar and different from the oxidative phosphorylation in aerobic respiration.
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*Due Wednesday: MB Quiz 3 (cumulative and timed); This is your "practice exam and will be cumulative. Study powerpoints, GRQs, class notes and all your LC questions! Also, check out the dynamic study modules on Mastering and the "Study Area" in Mastering for more Qs. Do week 5 survey too.*

Thur Sep 22	<b>EXAM 1 All material from Unit 1; Bring scantron!</b>
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## --UNIT 2 GENETICS--

### WEEK 6

Don't forget to print your new class outlines!

*Due Monday: GRQs + Cell division, Development, and cancer*

Tues Sep 27      Cell division

Contrast asexual and sexual reproduction in outcome and types of organisms/cells that use each

Recognize/draw the stages of mitosis, contrasting animal and plant cells and explain the consequences of specific stages of mitosis failing.

Describe how cell division plays a role in development.

Explain how cells know when it is time to divide.

Explain how cancer cells disobey the rules that normal cells follow in the cell cycle and in cell growth.

Explain the significance of a mutated BRCA-1 gene in terms of risks and consequences and the "utility" of a gene test for actionable genes.

*Due Wednesday: GRQs + Meiosis and GRQs+ Non-disjunction; Do week 6 email survey too.*

Thurs Sep 29      Meiosis

Define haploid, diploid, and homologous chromosomes and be able to calculate the diploid and haploid number when given an illustration of a cell.

Draw how variation arises during meiosis from independent orientation at metaphase I.

Describe the consequences of non-disjunction in the sex chromosomes in humans.

Predict the outcome of specific non-disjunction events or determine in which parent non-disjunction occurred.

Describe some ethical and medical issues arising from Down's Syndrome testing.

### WEEK 7:

*Due Monday: MB Quiz 4 (timed) and then GRQs + Patterns in Inheritance*

Tues Oct 4      Inheritance

Construct Punnett squares.

Determine mode of inheritance of a pedigree (autosomal dominant or recessive or X-linked recessive).

Calculate probabilities when given pedigrees.

Design genetic crosses that determine if a trait is dominant or to determine an individual's genotype.

*Due Wednesday: Flow of Genetic Information; Do week 7 email survey too.*

Thurs Oct 6      Inheritance & Information

Recognize and/or solve problems that are non-Mendelian variations of inheritance (incomplete dominance, co-dominance, multiple alleles, pleiotropy, and polygenic traits)

Draw a basic model of DNA, being able to point out where DNA variation is part of the structure.

Distinguish what makes somatic cells in the body similar and what makes them different.

### WEEK 8:

Tues Oct 11      No Class (University Day)

*Due Wednesday: Review flow of genetic information GRQs and do week 8 email survey.*

Thurs Oct 13      Flow of Genetic Information cont. Trace a specific DNA sequence all the way to a protein.  
Calculate the variations in code that lead to the same protein.  
Calculate variation in proteins of same size.  
Transcribe and translate two different alleles of a gene.  
Define an allele.  
Describe different types of mutations.

Week 9:

*Due Monday: MB Quiz 5 (timed and cumulative for this unit)*

*Study powerpoints, GRQs, class notes and all your LC questions! Dynamic study modules and "study area" of Mastering*

**Tues Oct 18      EXAM 2      All material from Unit 2**

*Complete week 9 email survey.*

Thurs Oct 20      NO CLASS: FALL BREAK

### **--UNIT 3 EVOLUTION & ECOLOGY--**

Week 10:

*Due Monday: GRQs + How Populations Evolve*

Tues Oct 25      How Populations Evolve      Distinguish components of the theory of natural selection that are true vs. common misconceptions.  
Distinguish creationist, theistic, and naturalistic views and what polls about evolution tell us about Americans and countries worldwide.  
Explain what science is and why the study of evolution is a science.  
Explain Darwin's ideas about natural selection and how his ideas were better understood once combined with Mendel's work.  
Define how microevolution is measured.

*Due Wednesday: Review GRQs from How Populations Evolve. Do week 10 email survey.*

Thurs Oct 27      How Populations Evolve cont. Explain the conditions that must be met for non-evolution.  
Perform Hardy Weinberg calculations and determine if a population is in HW equilibrium or not.  
Explain how genetic drift, mutation, gene flow and natural selection affect allele frequency in a population.  
Recognize what form of microevolutionary force is a driving force in examples of evolution.

Week 11:

*Due Monday: GRQs + Origin of Species + Common Ancestors*

Tues Nov 1      Origin of Species/Ancestors      Explain the uses for the biological species concept of species and its limitations.  
Define the conditions that lead to speciation.  
Distinguish various reproductive barriers that keep species separate.  
Explain how plants diverge into two new species in one generation  
Construct a phylogenetic tree when given morphological data and a list of organisms.

*Due Wednesday: MB Quiz 6 (timed) and then GRQs + Adaptations; Do week 11 email survey too.*

Thurs Nov 3      Wolves and Adaptations      Hypothesize how dogs may have evolved from a wolf-like ancestor.  
Describe the features that helped vertebrates transition from water to land.  
Given data about fossils with features of fish and tetrapods, determine the lineage for tetrapod evolution.

Week 12:

*Due Monday: GRQs + Population Ecology*

Tues Nov 8      Population Ecology      Explain how scientists estimate population size and perform a calculation to estimate student population in our classroom.  
Use the exponential growth model to calculate population growth.



Compare and contrast logistic and exponential models of growth.

*Due Wednesday: GRQs + Interactions within Communities; Do week 12 email survey too.*

Thurs Nov 10      Populations & Communities      Describe what happens to population size, death rates, and birth rates as countries become developed.  
Compare ecological footprints  
Distinguish levels of hierarchy in ecology and which levels include abiotic interactions with organisms.  
Explain the consequence of two species having the identical niche.  
Describe and give examples of five types of community interactions.

Week 13:

*Due Monday: then GRQs + The Microbiome*

Tues Nov 15      The microbiome      Compare/contrast germ free and conventionally raised mice.  
Explain why the community of microbes that live in our intestines can be considered a second “digestive system” for the human host.  
Provide evidence that a change in diet affects the microbial community within the mammalian gut.  
Provide evidence that the composition of gut microbes can cause obesity and reflect on the impact of this idea in human health and physiology.

*Due Wednesday: MB Quiz 7 (cumulative and timed) Do week 13 email survey too.*

*Study powerpoints, GRQs, class notes and all your LC questions. Dynamic study modules and “Study area” in Mastering.*

**Thurs Nov 17      EXAM 3      All material from UNIT 3**

Week 14:

**--UNIT 4 ANATOMY & PHYSIOLOGY (A & P)--**

*Due Monday GRQs and Homeostasis*

Tues Nov 22      Homeostasis      Explain how “emergent properties” arise from the structure and function of individual components of a system.  
Define homeostasis and explain how homeostasis is maintained.  
Give examples of homeostasis in the body and the consequences of imbalance.  
Define the characteristics of cells/ tissues/organisms that make for efficient exchange.

*Complete week 14 email survey.*

Thurs Nov 24 NO CLASS: THANKSGIVING

Week 15:

*Due Monday Reproduction part I*

Tues Nov 29      Reproduction      Describe the structure and function of male and female anatomy.  
Discuss prevention and consequences of various STDs.

*Due Monday GRQs and Reproduction part II and Immunity; Do week 15 email survey too.*

Thurs Dec 1      Reproduction/immunity      Illustrate how the hormones and anatomy of the reproductive age female change over a month-- with and without pregnancy.  
Explain how the pill prevents pregnancy.  
Describe the body’s innate defenses and how they differ from adaptive defenses.  
Compare and contrast humoral and cell-mediated immunity.

Week 16:

**MB Quiz 8 (timed)** *Do week 16 email survey too.*

Tues Dec 6 Immunity and Course Review

Explain how vaccine's work with the adaptive immune system.  
Team-based cumulative course review questions

*Complete final email survey.*

*Study and Review, especially material from earlier in the semester!*

**TUESDAY DEC. 13 8:00-10:30 AM Final exam (cumulative, ~70 questions) In GSB 100**

<http://registrar.unc.edu/academic-calendar/final-examination-schedule-fall/>

\* The professor reserves the right to make changes to the syllabus, including project due dates and test dates (excluding the officially scheduled final examination), when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.