BIO100 (Principles of Biology)

This is an "introductory biology course for non-majors that covers major principles in biology as they relate to higher organisms. When possible, the human organism is selected to illustrate a principle."

If you thought you had signed up for Hermeneutics, you'd better check with the registrar. I mean, sure, we're going to deal with hermeneutics to some extent, but not enough to satisfy you die-hards in the audience.

Here's a link to the knowledge survey I told you about in class this morning. I realize why it wasn't up before: I was waiting to see who was actually in the class so that I could code the buttons properly!

Classes

Lectures will be held in Room 102, Priscilla Payne Hurd Academic Complex
Mondays, Wednesdays, and Fridays, 11:30 am to 12:20 pm

Lab

Lab meets in Room 301, Collier Hall of Science
Wednesday afternoons, 12:45 to 3:45

Text

The text required for this course is the 3rd edition of *Biology: A Guide to the Natural World*, by David Krogh (Prentice Hall, 2005).

Companion Website for the text

BIO100 (Principles of Biology)

My primary goal for Bio100 is to give you an appreciation for, and understanding of, Science. Yes, that's "Science" with a capital "S" because everything we will be discussing is (to some extent) true of all branches of science. And for most of you, this is the last formal exposure to scientific subjects that you'll ever have, so it is (as I hope you'll see over the course of the semester) very important to me that you finish this course equipped to cope with all the "scientific" folderol that you'll come up against for the rest of your lives.

Of course, the fact that we're studying biology specifically is great, because biology is the bestest, most interesting of the sciences. And you can believe that, because I'm a Scientist, and therefore completely objective and rational, all of the time.

Okay, more seriously, here is a more detailed list of what I want you to learn in this course:

- why a basic understanding of science is important for every educated person today; science is one of the pillars of a liberal arts education
- the strengths (and weaknesses) of the scientific method
- the meaning of terms such as "hypothesis" and "theory" in a scientific context
- an appreciation of how science changes, and will continue to change in the years ahead
- the ability to approach a problem scientifically
- to design and carry out a good experiment to test your hypotheses
- to be able to judge the validity of scientific claims made by others

In short, by May I hope that you will feel (and be!) fairly self-sufficient in navigating the ins and outs of basic science. More importantly, you'll feel confident in being able to learn what you need on your own — no one course, or even 4 years of them, can prepare you with everything you're going to need to know. And you'll need it — people are going to try and snow you with "evidence" and "proof" for the rest of your lives, and you need to be able to distinguish the good from the bad.

BIO100 (Principles of Biology)

A note on grading: I do not grade on a curve, so I hope that each of you will do your best to help your fellow students: if they benefit, it does you no harm. In fact, one of the best ways to learn something is to explain it to someone else, so talk to your classmates (see Studying Biology in the "Policies" section).

I'm going to be using the point system for this course, so you don't have to worry about calculating percentages for individual components. I'll try to keep an up-to-date total here on the website, so you can always determine your grade so far by comparing what you've earned with the max possible. (And don't you just hate Max, that little weenie?) Given my grading scale, you can therefore calculate your own grade in the course at any time.

Here are the basic (by which I mean "important" (by which I mean "they affect your grade" (of course))) components of this course — in alphabetical order.

- Attendance
- Exams
- Lab Notes
- Lab Reports
- Miscellaneous Assignments
- Participation

Attendance

It's important that you be in class. As you will discover, there will be no lecture notes for me to give you should you miss a meeting, no little PowerPoint handouts. Classes will be devoted to reviewing the topic for the day, informed by your preparatory reading. Needless to say, that reading is critical to your ability to participate in class, clarify any difficulties you're having, and succeed in learning as much as you can about biology.

To emphasize how important I think attendance is, every day you're in class (and awake) is worth 5 points toward your final grade. Being in lab is worth 10 points. If you're late, I dock 1 point for every 5 minutes late (or fraction thereof).

Exams

There will be four exams, not including the final. Each will focus primarily on the material covered since the previous exam, but anything covered during the semester up to that point is fair game. The final will be "semi-cumulative": about half of the exam will focus on material since the previous hour exam, but the other half will range over material from the entire semester. Barring extenuating circumstances (and it is entirely up to me to decide what is an acceptable circumstance), no make-up exams will be given. The four hour-exams will each contribute up to 100 points toward your final grade, and the final exam will contribute up to 200 points (but see my policy on extra credit).

There will be no make-up exams except in cases where I had advanced warning of your missing the exam, or you were unable to notify me due to circumstances beyond your control. Note that in **any** case, I may decide not to allow a make-up exam regardless of circumstance.

Lab Notes

Keeping an accurate, legible, and complete laboratory notebook is an ***absolute requirement*** of this course. Your notebook must be bound (no ring binders, no spiral notebooks), but beyond that I don't care; feel free to use one of those cheap tablet notebooks. If you want to re-copy your notes, that's fine, but I am only concerned with your "official," written-in-lab notes.

I will examine your notes weekly and give you feedback on them. I will collect your notebooks at the end of the semester and evaluate them. Your lab notes will be worth 100 points, and will also be available to you for a portion of the final exam, so do a good job with them!

Lab Reports

I will be asking for lab reports for almost every lab we do. Usually these will be in a straightforward short-answer format, but I will let you know what I expect for each lab as they arise. Each report will be worth 100 points.

For group reports, I expect them to be group efforts. Every group member's name should of course appear on it, and I want every member to sign the front/top somewhere, indicating that he or she has read the final report and accepts responsibility for its contents.

Miscellaneous Assignments

I will give occasional miscellaneous assignments over the course of the semester. These will be worth whatever points I announce at the time. Late assignments **will not be accepted**. I anticipate that there will be a total of 100 to 200 points in this category by the end of the semester.

Participation

Class participation will necessarily be somewhat subjective, but will encompass just that: participating in class. Asking questions, answering questions, being prepared to discuss whatever topics arise, doing your share of the work in lab -- you're not children, you know what is meant by the term "participation." I assume a certain amount of participation on everyone's part; I will award up to 100 points for participation "above and beyond" at the end of the semester toward your final grade. Conversely, I will also dock up to 100 points for anyone who is not holding up their end in class.

BIO100 (Principles of Biology)

Below you will find various course policies, including:

Grading

I'm going to be using the point system for this course, so you don't have to worry about calculating percentages for individual components. I'll try to keep an up-to-date total here on the website, so you can always determine your grade so far by comparing what you've earned with the max possible. (And don't you just hate Max, that little weenie?) Given my grading scale, you can therefore calculate your own grade in the course at any time.

I've laid out the course components and their point values separately, but to summarize:

Lecture Attendance	200 points
Hour Exams	4 @ 100 points = 400 points total
Misc. Assignments	100-200 points
Final Exam	200 points
Laboratory Attendance	130 points
Laboratory Notebooks	100 points
Laboratory Reports	1200 points
Anticipated Total	**2380-2480 points**

I reserve the right to tweak these distributions as I see fit: if for example no one appears to be doing the reading, I may institute short, sporadic quizzes. These will in all likelihood be given in the first few minutes of class, and no make-ups will be given. In order for them to be taken seriously, I will have to shoehorn them into the grading scheme outlined above.

Here is the grading scale I use in all my classes:

numeric grade	**letter grade**
93.3 - 100	A
90.0 - 93.2	A-
86.7 - 89.9	B+
83.3 - 86.6	B
80.0 - 83.2	B-
76.7 - 79.9	C+
73.3 - 76.6	C
70.0 - 73.2	C-
66.7 - 69.9	D+

63.3 - 66.6	D
60.0 - 63.2	D-

Just to review, this is what the Student Handbook has to say about grades:

A and A-
: These grades are given for achievement of the highest caliber. They reflect independent work, original thinking, and the ability to acquire and effectively use knowledge.

B+, B, and B-
: These grades are given for higher than average achievement. Evidence of independent work and original thinking is expected.

C+, C, and C-
: These grades are given when the student has devoted a reasonable amount of time, effort, and attention to the work of the course and has satisfied the following criteria: familiarity with the content of the course, familiarity with the methods of study of the course, and active participation in the work of the class.

D+, D, and D-
: These grades are given for unsatisfactory work, below the standard expected by the College. They indicate work which in one or more important aspects falls below the average expected of students for graduation. The work is, however, sufficient to be credited for graduation, if balanced by superior work in other courses.

Attendance

If you are going to be absent from class or (Heavens forbid!) lab, please do me the courtesy of letting me know in advance if at all possible. Don't forget that it is *your* responsibility to notify me if you will be away for a field trip, sporting event, or other school-related function. It is not my responsibility to keep up with all the myriad activities which you might be involved in, according to the student handbook.

Reading

In this course, the reading is critically important. Classtime will be spent discussing the reading for that day; I will not be lecturing. If you don't keep up with the reading -- and by that I mean **active** reading, not just using a highlighter -- you won't be able to keep up in class, you won't fully understand what's being taught, the class will rapidly become a waste of time for you.

Late Assignments

Assignments turned in late will not be accepted. Period.

Extra Credit

On a 100-point hour exam, I will give you 110 points-worth of questions. Thus, you can miss (nearly) 10% of the questions on any hour exam and still get the full 100 points. With the exception of these additional points on exams, there will be no opportunity for extra credit in this course. Spend your energy learning the course material; "extra credit" is a sham and a cheat.

Food

No eating in class, unless you can convince me it's medically necessary. *I* don't eat in class!

Cell Phones

Cell phones are tools of Satan. They are without significant positive value in my world and while I don't expect you to share my view of them, I expect you to spare me from being rudely reminded of their existence. If you are expecting an ***urgent*** phone call while in class or lab, alert me to that fact ahead of time. Otherwise, if your cell phone goes off in class or lab, you might as well pack up your things and go home, because I won't give you any credit for being there. Some day this will be looked on as one of my loveable eccentricities, but until then you'll just have to put up with my sociopathy.

Lab Conduct

There is to be ***NO*** food or drink in the lab at ***ANY*** time. Rules have gotten stricter, fines have gotten much higher, and our loveable Republican "smaller government" is coming after undergraduate institutions like never before. If I see any comestibles or potables in lab you will be docked points in accordance with my mood; if I see you put anything into your mouth, I may well dock you several hundred (yes, *hundred*) points. This is a serious infraction of laboratory protocols.

The ***ONLY*** exception to this policy is when we are doing experiments with food — I will let you know in advance what is permitted in these labs.

The only thing worse is endangering other students or their data, whether through carelessness or malice. If I find anyone doing something which might result in harm to another student or compromise their experimental results, I will fail the perpetrator. I am by and large a fairly easy-going guy, but there are some things which are simply beyond the pale; this is one of them.

Group Lab Reports

For certain labs I will require group (rather than individual) lab reports. When submitting group reports, please be sure to:

- Do not include the questions in your report — I *know* the questions!
- Use "we", not "I" — this is to be a *group* effort.
- Include the title, date, and the names of your group members.
- Every member of the group must initial the report, indicating that they are satisfied with it and agree to its contents.

If there are any questions about this format, please don't hesitate to ask me.

Studying Biology

Science is a collaborative venture. I urge you to get together with your fellow students as much as possible to study the material for this course in groups. Discussing problems, studying for exams with other students, and asking each other questions on the reading assignments are all examples of activities which will benefit you and which I encourage. Obviously you cannot consult with others during exams or quizzes, but the homework may be something of a grey area for many of you. For my courses, you must prepare your own answers to assigned problems, but I feel that getting together with other students in the course to discuss and think through problems together is not only perfectly acceptable, it is a very good idea. If you have arrived at what you believe to be the correct answer, put it aside for fifteen minutes before writing it down; this way you can be more confident that you really know what it is you're saying, and your answers won't be identical to your partners'.

Note that the idea of collaborative learning in this way does not mean that you should ask for answers from others who have already taken this or a similar course, nor should you necessarily just accept an answer from a classmate whom you think is likely to be right. Everybody is mistaken sometimes, and if you don't understand **why** his or her answer is the right one, well, then you don't understand it. And that is not where you want to be. Conversely, if you're sure you've got the right answer, don't just tell your study group and be done with it. Try to help them arrive at the same conclusion you did step by step; someone else may come up with a very different view of the problem which forces you to rethink your approach. And rethinking your approach, even if it doesn't turn out to change your mind about your answer, is critical to your success as a scientist.

My concern is not that you "learn" biology, seeing it as a (very large) pile of facts, but that you **understand** it. Your fellow students and I are resources to help you; it's up to you to do the work necessary to gain that understanding.

You should expect to spend ***at least*** 2 hours studying on your own for every hour in the classroom. At a ***minimum***. That's true for every class, not just mine. If you're content to just slouch through, willing to trade a better grade in the course for whatever you think is more important than your studies, you're welcome to do so. But if you want to excel, not only for the sake of a higher mark on your transcript, but also for the sake of your education, you owe it to yourself to put in enough effort that you can honestly say to yourself at the end of the semester, "I did my best, and I learned as much as I could in that course." If you do, I'll do everything I can to make this a worthwhile experience for you.

Academic Honesty

I adhere to the Academic Honesty policy of the College. There is nothing more important to me than personal integrity - not biology, not happiness, not power, nothing - and I conduct myself and all of my classes in that spirit. If you're not familiar with College policy, you should be.

BIO100 (Principles of Biology)

Meeting number	Date	In-Class	Background Reading
1	Mon., Jan. 16	organizational meeting	
2	Wed., Jan. 18	(He blinded me with) Science!	chapter 1
3	Fri., Jan. 20	The chemistry of life, part I	chapter 2
4	Mon., Jan. 23	The chemistry of life, part II	chapter 3
5	Wed., Jan. 25	Cells	chapter 4

6	Fri., Jan. 27	Cell Membranes	chapter 5
7	Mon., Jan. 30	Energy	chapter 6
8	Wed., Feb. 1	Cellular respiration and photosynthesis	chapters 7 and 8
9	Fri., Feb. 3	Cell division	chapter 9
10	Mon., Feb. 6	exam 1	chapters 1–8
11	Wed., Feb. 8	Meiosis and gamete formation	chapter 10
12	Fri., Feb. 10	Genetics fundamentals	chapter 11
13	Mon., Feb. 13	More genetics	chapter 11
14	Wed., Feb. 15	Chromosomes and heredity	chapter 12
15	Fri., Feb. 17	How DNA works	chapter 13
16	Mon., Feb. 20	Making proteins	chapter 14
17	Wed., Feb. 22	Biotechnology	chapter 15
18	Fri., Feb. 24	Evolution fundamentals	chapter 16
19	Mon., Feb. 27	exam 2	chapters 9–15
20	Wed., Mar. 1	Microevolution	chapter 17
21	Fri., Mar. 3	Macroevolution and speciation	chapter 18
	Mon., Mar. 6	No Class (Spring Break)	
	Wed., Mar. 8	No Class (Spring Break)	
	Fri., Mar. 10	No Class (Spring Break)	
22	Mon., Mar. 13	taxonomy	chapter 18
23	Wed., Mar. 15	Everybody outta the pool: life moves onto land	chapter 19
24	Fri., Mar. 17	Really tiny stuff: bacteria and viruses	chapter 20
25	Mon., Mar. 20	Fungi, plants, and animals	chapter 21 & 22

26	Wed., Mar. 22	More animals	chapters 22
27	Fri., Mar. 24	Plant structure, function, and growth	chapter 23 & 24
28	Mon., Mar. 27	Animal tissues and organs	chapter 25
29	Wed., Mar. 29	exam 3	chapters 16–24
	Fri., Mar. 31	No Class (*Drosophila conference*)	
30	Mon., Apr. 3	Muscles and bones	chapter 25
31	Wed., Apr. 5	Nerves and hormones	chapter 26
32	Fri., Apr. 7	Detection and defenses	chapter 27
33	Mon., Apr. 10	Moving stuff around the body	chapter 28
34	Wed., Apr. 12	Growing up: animal development	chapter 29
	Fri., Apr. 14	No Class (Easter Break)	
	Mon., Apr. 17	No Class (Easter Break)	
35	Wed., Apr. 19	Making babies: human reproduction	chapter 30
36	Fri., Apr. 21	Populations and communities	chapter 31
37	Mon., Apr. 24	exam 4	chapters 25–30
38	Wed., Apr. 26	Ecosystems	chapter 32
39	Fri., Apr. 28	Animal behavior	chapter 33
	sometime in May at 1:30 pm or 4:30 pm	**FINAL EXAM**	

Life is fluid, so this syllabus is subject to change. I will do my best to adhere to it, but helping you learn as much as you can about molecular genetics trumps any satisfaction I might glean by marching us in lockstep through the semester.

BIO100 (Principles of Biology)

Lab Syllabus

Session	Date	Activity	Background Reading
1	Jan. 18	laboratory policies & practices Scientific Method	text section 1.2
2	Jan. 25	Biomolecules	lab protocol text sections 3.5–3.7
3	Feb. 1	Enzymes	lab protocol text sections 6.5 & 6.6
4	Feb. 8	Microscopy	lab protocol text sections 4.3 & 4.7
5	Feb. 15	Genetics	text section 11.4
6	Feb. 22	DNA & Molecular Genetics	lab protocol text section 15.2 & p. 299
7	Mar. 1	Evolution	text section 19.8
	Mar. 8	No Lab (Spring Break)	
8	Mar. 15	Taxonomy	text sections 18.4 & 18.5
9	Mar. 22	Animals	lab protocol text sections 22.4, 22.5, & 22.9
10	Mar. 29	Plant Physiology	lab protocol text sections 23.2 (Roots & Shoots)

			& 23.3 (Plumbing)
11	Apr. 5	Nervous System	text sections 26.3, 26.4, 26.10 & 26.12
12	Apr. 12	Bacterial Sampling	lab protocol text section 20.3
13	Apr. 19		
14	Apr. 26		

Life is fluid, so this syllabus is subject to change. I don't anticipate any significant deviations, but remember that it's written in electrons, not stone.