Bio 101 | Introduction to Biology (4 credits) | Summer 2015

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Class Meetings: No set times, but modules do have start and end dates!
Text: Postlethwait/Hopson: LIFE, 1st Edition
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Catalog Description
An introductory course in biology for non-majors using the scientific method in the study
of molecular, cellular, organismal, taxonomic, genetic, ecological, and evolutionary
aspects of life. A weekly laboratory emphasizes observation and problem solving.
Students completing this course will understand the basic theories of life and be prepared
to critically evaluate reports of biology research that they encounter as informed citizens.¹

Foundational Area of Knowledge Statement:
BIO 101 Introduction to Biology fulfills the requirement for a Foundational Area of
Knowledge in Scientific Perspectives.
E. Scientific Perspectives
  Doane students will gain a greater understanding of scientific thinking and
  application using core ideas in a course that includes a laboratory or field
  experience. Students will consider the complexities of scientific methodologies in
  one or more disciplines of the natural sciences, the scientific context of issues they
  will confront as informed citizens, and the scientific impact on the global
  community. Students will work to:
  1. Employ methods of science for inquiry in a scientific discipline
  2. Develop their scientific literacy and ability to critically evaluate
     scientific information
  3. Consider the ethical and social implications of scientific study and use of
     scientific findings.²

This course will address all of the outcomes associated with the Scientific Perspectives
Foundational Area of Knowledge, but will focus most frequently on developing your
scientific (mainly biological) literacy and ability to critically evaluate information. We
will consider the ethical and social implication of scientific study and the use of scientific
findings explicitly in a couple of discussion “labs”. In other labs we will do some
inquiry. The fact that I also get to introduce you to the amazing way the living world
works is a bonus.

¹ This is exactly what it says in the 2013-2014 Undergraduate Catalog. Labs for the online version won’t
   actually be weekly.
² Taken from the 2014-15 School of Arts and Sciences Crete Campus Catalog
Communicating with your instructor
While I consider it important to be available for questions and discussions, I will not be available 24/7 for real time communication. I will be available between 4 and 8 hours each day, and do have other demands on my time. So if I don’t answer immediately, I’m not ignoring you. I might be at work, doing family-type stuff or even possibly asleep.

The main way you will interact with me is via the discussion board. All of the questions you have about how to make blackboard work, what’s due and when, understanding the readings, etc. should be directed to the appropriate discussion thread. This has several advantages over email. One is that there are probably other people with the same question, and so even if they never work up the nerve to ask they will benefit from the answer. It also means I only have to answer the question once. Another benefit is that one of your classmates may be able to help before I even see the question. They are more likely to be online at 2 a.m. than I am.

Email is what you should use if you need to contact me privately, for example, if you have a question about your grade. If you ask questions about the course material via email, I will probably post it to the discussion board and answer it there. I respond to things that are urgent or simple first, and try to respond to everything within 24 hours. I usually check it once or twice a day; I check the discussion boards more frequently, but that doesn’t mean you should post to a thread to tell me you sent me an email. Don’t do that.

It’s fine to call me at home for things that are urgent, but think before you call. I’m not really sure what kind of emergency would require a phone call, since usually students call to tell me they are ill, which is less urgent in an online format, but if you need to, give me a call. Please don’t call after 11 pm., and don’t call before noon on Sundays, because that’s when I do all of my sleeping. I’m usually in Omaha all day on Saturdays, and really hard to contact then. My family has a tendency to screen calls, so when the robot voice tells you to, start leaving a message. If I’m around, I’ll pick up. If no one answers, finish leaving a message.
I grew up around St. Louis and moved to Lincoln in 1994. I have a BS and MS in Biology from Southeast Missouri State University and a Ph. D. (vintage 2001) from UNL. My interests are in herpetology (mainly lizards), behavior, communication and phylogeny. I am not currently engaged in any biological research, but my experimental life involved the social behavior of a particular lizard, *Sceloporus undulatus*. My research right now is into pedagogy rather than biology.

I taught for several years at UNL, and came to Doane in 2011. I’ve taught Human Anatomy, General Ecology, General Biology, Ecology and Evolution, Comparative Anatomy and Biodiversity Labs, along with Evolution, Human Physiology, Organismic Biology, Introductory Zoology and General Biology Lectures. (And Sushi Biology as an Interterm.) I greatly enjoy the interactive component of teaching, and trying to retain that was the biggest challenge last year when I taught Bio101 online for the first time. I think I have a better idea of how to do that now, and the online experience changed the way I teach in the classroom as well.

I am married and have two children. My daughter is 15 and my son is 11. I have a second job that requires wearing a nametag and being nice to people. Somehow, my son got me hooked on Pokemon video games, probably when I was tired and not paying attention. I like food, with a few exceptions. I like listening to music, with not many, but more than a few, exceptions. I read a lot, although that’s mostly on screen rather than as books now. I have a sense of humor, but you may never notice it.

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3 St. Charles, MO, but nobody knows where that is.
4 The study of the process of teaching. I’m never sure how to pronounce it, but I know it requires many footnotes.
5 I hope you aren’t expecting me to tell you how old my wife is. I’m not that great at social conventions, but I have definitely figured out that one. Oh, and my son is not 16105 years old. The superscript only indicates a footnote, and does not also raise 11 to the 5th power.
6 I don’t like the card games or the animie or merchandise. I just like the video games, because, well, gotta catch ‘em all, right?
7 *Natto* is something I don’t care for. Not a big fan of cherries. It’s actually pretty hard to think of foods I won’t eat.
8 Most popular music that I can hear on the radio does not interest me. While you may think this is typical for an old guy, I’ve been like that since I was 12. I like a lot of types of music, but I rarely hear it on the radio (at least here and where I grew up—I’m sure New York or Chicago would be better).
9 And an unhealthy fondness for footnotes. Perhaps you thought I was going to explain humor.
10 You won’t find it down here, that’s for sure. Fnord.
The Big Picture

Welcome! Over the summer session we are going to be taking a very quick tour through the enormity of the biological sciences. Biology is the scientific study of living systems, so we’ll need to spend some time thinking about what science is and what living systems consist of. There are many different sorts of biology, and somewhere in the course of this course, you’ll run into many of them. We’ll try to figure out what it means to be alive, and identify some characteristics shared by all living things. We’ll then address how organisms stay alive and how they make more of themselves. This will take up roughly the first half of the semester. The remainder of our time will be spent describing the huge diversity of life, and trying to make some sense of it.

Science is one way of observing and explaining the world around us (and also what’s inside us). It is distinguished from other methods of learning by several characteristics. Probably the most important characteristic of science is that scientifically obtained explanations (what we call hypotheses) are falsifiable—we can be wrong and there are ways to demonstrate that we are wrong. Another characteristic of scientific statements is that they are transparent and (relatively) objective. This means that other people know how we came to develop a hypothesis, and can check to see if they get the same results (or interpret the data in the same way). Science is done by scientists, who are all at least technically human, so actual science isn’t perfect, but it works very well. Hypotheses are explanations of observations, and they are tested to see how well they fit observations by doing some kind of experiment. If an experiment fails to support a hypothesis, it’s time to come up with another one. If an experiment fails to reject a hypothesis, that’s reassuring, but not conclusive. If several experiments by several researchers still don’t reject a hypothesis, it can be provisionally held to be “true”, and is often called a theory (or, if it has held up really well, a law). A scientific hypothesis is a guess with observations and perhaps experiments behind it, and a theory is much, much more than a guess.

One thing that bothers many people is that scientists never seem to say what it is right or true, only that something has or hasn’t been shown to be wrong. That’s because there is no way to be 100% certain that a hypothesis, theory or law is not wrong since we can’t test every possible combination of variables. Scientists view their hypothesis as falling on a scale of probabilities, with disproven hypotheses having zero probability of being correct, and laws having a probability of being correct that is large, but less than 100%. The way science works is that it can tell us when we are wrong with certainty, but can only tell us some probability of being not wrong. That may seem rather unsatisfying, but it works quite well.

This class will focus on a particular type of science, the scientific study of living systems. Biologists try to explain living systems via a series of observations that hopefully lead to theories that can be applied to other parts of the living world. Some theories, such as evolution or the transfer of information from nucleic acids to proteins have wide application throughout biology. Others are more limited. Biology includes portions of other sciences, but deals in some way with living things.

We will cover the extent of biology in a single semester. This is a huge goal that is not possible if we cover everything in depth. Rather, we will examine the general

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11 Of course.
problems and selected examples that can be applied to a variety of other situations. You can continue to build from this point on your own as new questions arise. This is the goal of a university education, to provide you with the framework on which you can continue to build. We will mostly be concerned about breadth rather than depth.

So, here’s what we want to do:

**Acquire the necessary vocabulary to be able to speak precisely and accurately about biology.** You’ll pick this up bit by bit as we go along. You will be learning a new language, but it’s a strange one, because it resembles English in its grammar and syntax, but Latin and Greek in its vocabulary.

**Place the study of living things in a broader scientific context.** This will help us to organize the vast amount of information. The most important organizing principle will be that of *organic evolution*. You don’t have to accept it, but you will need to understand it. Another organizing tool is the *hierarchical structure* of living systems. These fundamental principles will be used to examine the relationship between structure and function in organisms, and how larger systems containing organisms (*populations, species, communities and ecosystems*) are structured and maintained based on properties of smaller components (*cells, organelles, molecules*, etc.).

**Develop a basic biological literacy.**

Some big questions we will address:

- What are the inorganic properties and materials that compose living things?
- What are the basic components of cells?
- What processes keep a cell alive?
- How do organisms manipulate information and make more organisms?
- What explains both the fundamental unity and fantastic variety of life?
- Why are there so many different kinds of living things?
- What interactions with other organisms are important to living things?
- What interactions with non-living things are important to living ones?
- Why should we care?

These questions roughly represent a hierarchical organization of investigation, where answers to the first questions help us develop later ones, and approximate the way I’ll talk about things. The last question has more than one answer, and is something that varies from person to person. You may never have an answer, and that’s perfectly fine.
Expectations

Interactions with me

I expect all students to:

• Be familiar with all portions of this syllabus
• Prepare adequately for class (even though you aren’t in a classroom!)
  • Read the chapter before starting the lecture
  • Reduce distractions
• Ask lots of questions!
  • Realize that there are very, very few short and simple answers

You can expect from me:

• Respect
• Concern about your performance
• Familiarity with all of the material
• Expertise on a few subjects
• Random outbursts of enthusiasm, especially about things that only made sense to me fairly recently.
• Competent guidance
• Timely feedback
• Questions in response to questions
• Inexplicable references to cats, squid, my son, and math rock.
• Powerpoints. I am sorry.
How I evaluate you

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Number</th>
<th>Percent of Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>Homework</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Labs</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Participation</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

All of this assessment will be done through Blackboard. Each item will be made available for a set period of time, and must be completed before the deadline. I will not open up any of these items after the deadline passes! Pay close attention to the course schedule.

Detailed explanations and instructions for all assessments will be available in the associated portions of the course Blackboard site, but the short version is this:

**Quizzes**
Each of these will be a mixture of multiple choice, fill-in the blank and short answer questions. This will be available during a particular time frame via Blackboard. I will maintain a bank of potential quiz question on the course Blackboard site. There will be one quiz for each of the 5 modules.

**Homework**
These will be five critiques of articles from the popular media, one for each module. Specific instructions will appear at the start of each module, and the critique is due at the end of the module. You will not get credit for critiques submitted after the deadline, but I will still give you feedback.

**Labs**
Labs will primarily take the form of simulations and discussions. Some will just require completing a worksheet, while others will require a more detailed write-up. Each lab will have all the links and materials posted at the start of a module, and whatever homework is associated with it will be due during that same module.

**Participation**
This will be based mostly on use of the discussion board, and completion of surveys at the beginning and end of each module.

**Extra Credit**
I don’t offer individualized extra credit—everyone has the same opportunity for points. There are no optional assignments, no dropped quizzes and absolutely no personalized opportunities for extra points.
Grading Scale
I will use a modified grading scale, and I don’t round off and I don't curve. If you miss a grade by .0001%, you really will miss that grade by .0001%, so be proactive rather than reactive about your performance. (This means take steps to improve your grade early in the semester—talking to me is a good way to do that. If you wait until after the final to discuss your grades, not much can be done.)
If you are expecting an “A” in this course, you’ll need to not only put in some effort, but work to understand and synthesize the material. Simply reading the online materials and the textbook, doing the labs, and making a basic contribution to discussion is the minimum expectation for this course, and will likely result in an average grade. An average grade is a “C”, not an “A” or a “B”, which are used to indicate exceptional and above average achievements, respectively. In order to get a grade higher than a B, you must complete all assessments. So, if you have 95% of the points, but did not turn in one of the article critiques, you won’t get an A!

The scale in detail breaks down like this:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 - 100%</td>
</tr>
<tr>
<td>A</td>
<td>93 - 96.99%</td>
</tr>
<tr>
<td>A-</td>
<td>90 - 92.99%</td>
</tr>
<tr>
<td>B+</td>
<td>85 - 89.99%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 84.99%</td>
</tr>
<tr>
<td>B-</td>
<td>75 - 79.99%</td>
</tr>
<tr>
<td>C+</td>
<td>73 - 74.99%</td>
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<tr>
<td>C</td>
<td>70 - 72.99%</td>
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<tr>
<td>C-</td>
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<td>D+</td>
<td>62 - 64.99%</td>
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<td>D</td>
<td>60 - 61.99%</td>
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<tr>
<td>D-</td>
<td>55 - 59.99%</td>
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<td>F</td>
<td>Less than 50%</td>
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<tr>
<td>P</td>
<td>85 - 84.99%</td>
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</table>

Grade Inquiries
If you have questions or concerns about a grade you get, here’s what you should do within 7 days of the grade being posted and (if relevant) the graded item being emailed to you:

1. Compare my grading to the posted key
2. Make sure I didn’t mark something wrong that seems to match the key
3. Check my math.
4. If you find any problems or still have questions, to let me know you have concerns, and we’ll take it from there. As long as I get the email within 7 days of the score in question being posted to Blackboard, I will consider changing your score.
5. In the rare event that we can’t resolve your concerns this way, I will make sure you know what the next steps are. I haven’t had to do that yet, but I know there are next steps.

How you evaluate me
Well, I consider your grade to be a reflection on my performance, as long as you actually turn things in, show up, etc. I’ll also be checking comprehension with the discussion board, and that gives me some idea of how things are going. I will probably have a formal, anonymous evaluation set up on blackboard at midterm and the end of term. You can also tell me directly how things are going at any time.
Blackboard
Blackboard is only for course-related stuff. It is not your personal mailing list to make announcements about your plans for the weekend or sell football tickets.

Tips for success
• Ask questions
• Turn everything in on time
• Prepare for quizzes

I have supplied several resources on Blackboard to minimize panic before quizzes. They can be found in the PowerPoints and Quiz Prep and Keys sections of the course website. Here's a suggestion as to how to use them. Access the lecture, slideshow, and the quiz prep questions. Go over your notes (yes, you can still take notes…) and the slideshow and then try to answer the questions without looking back at the notes and PowerPoint. See how much you can do with what’s in your head. Things that give you trouble are good to study more. I’ll set up a discussion thread for each lecture, and you are encouraged to ask questions (and try to answer them) there. The biggest danger of using my question banks is that you will convince yourself absolutely that an incorrect choice is the correct one, so interacting with your classmates is usually helpful. I’ll monitor the discussion threads to make sure you aren’t getting too far off track.

Do that after each lecture, not all at once right before a quiz

How to get clarification of a potential quiz question:
• Include the full text of the question you are struggling with.
• Show me that you have been trying to answer the question
  o Have you ruled out some possibilities? Why?
  o What do you think the correct answer is? Why?
• In return, I’ll ask you questions to help focus your efforts, and/or give you a reference to where you can find the answer in the PowerPoints
• I won’t directly answer your question, because that would be like posting a quiz key before the quiz, which is not consistent with my teaching philosophy.
Priorities
I realize that there is more in your life than this class, however…

Things that don’t affect your grade calculation:

• Scholarship GPA requirements
• Financial aid GPA requirements
• Performance in other classes
• Having a job
• Having a family
• Having a commute
• Etc.

Basically, you need to come to terms with the fact that the only thing I consider when assigning you a grade is the number of points you earned. I can be objective in point assignment, but any other considerations would be unfair to your classmates. If there is something going on in your life that is more important to you than this class, I will absolutely respect that, and appreciate knowing about it, but I will not calculate your grade differently because of it. If I can help you with time management or prioritizing, I will, but ultimately you make the decision as to how much of your resources to devote to this class.

Students with Disabilities
Students with documented disabilities are entitled to reasonable accommodation to ensure that student has the most equal possible opportunity to succeed in class. Students needing accommodations should make arrangements through SSD as soon as possible. I will get an official accommodation letter emailed to me, but it’s a good idea to talk to me directly as well.

Academic Dishonesty Policy
All work you submit must be your own. Portions not yours must be properly cited. No direct quotes unless there is no way to paraphrase.

I take violations of academic integrity very seriously. The most common violations I see are plagiarism and cheating, but there are other forms as well, as explained in section 2 of your Code of Conduct. If I suspect you have violated the expectations of academic integrity, the first thing that will happen is that I will contact you. If I still have concerns after talking to you, I will file a report with the Chair of the Academic Integrity Committee, who will start the formal process. If I am notified that this process has confirmed my allegations the following will occur:

• First offence—zero on that assessment and additional penalties based on discussion.
• Second offence—F in the course.

Complicity in academic dishonesty incurs the same penalties.

If you aren’t sure what I mean by cheating or plagiarism, ask me about it. I think most people grasp the concept of cheating (for example, looking at someone else’s exam, bringing in something with the answers to surreptitiously consult, things like that). Plagiarism may not be so clear. Basically, if you put your name on some piece of work, and the contents are even partially the work of someone else that you do not credit, you are committing plagiarism. I am absolutely serious about these penalties, and I will (and have) apply them as stated. I consider recycling your own work to be a violation of academic integrity as much as I do recycling someone else’s.
It’s not really all that hard to tell when someone is misrepresenting something as their own work. Even without the benefit of SafeAssign, it’s pretty obvious, and I know how to use Google (surprise!). Not everybody gets caught, I assume, but a few do every semester.

The two most common “explanations” I get for why someone commits plagiarism are “I came from a small town” and “it was OK in high school”. Neither of those is going to help you. Most people that attend Doane come from a small town. That doesn’t mean you live on a different planet with different definitions of honesty, just that there are fewer stoplights. I seriously doubt that plagiarism is acceptable at any reputable high school, but even if that is the case, this is not high school.

The 3rd most common explanation is something along the lines of “I have too many other things to do”. I sympathize, but cheating in my class is never going to make your life easier. If you consider those other things more important than this class, take the class when you have fewer things on your plate. If learning is important to you, you will be much better off rearranging your other commitments rather than taking shortcuts.

All of this applies even in cases where you might work with a classmate to collect data or find references. Even if you work together (for example, in lab), what you turn in must be your own, independent creation.

See sections 2.01 and 2.02 in the Student Code of Conduct