

## BIOS 101 – Final report, fall, 2010, 10:30 MWF, Janovy

**Statistics:** As of 121410, there were 248 people officially registered for this section of BIOS 101. Graded activities were listed in the syllabus as:

(1) Hour exams – three @ 100 points each	= 300 points
(2) Final exam – one @ 160 points	= 160 points
(3) Written assignments 14 @ 10 points	= 140 points
(5) Mastering Biology (total)	= 100 points
(5) Attendance	= 100 points

TOTAL = 800 points

PORTFOLIO BONUS POINTS = 25 points

If I could recognize a student by name and face outside of class by Thanksgiving, that student received a 10 point bonus. To be eligible for portfolio points, a student had to have at least 120 writing points, 90% attendance, and 70% or higher in Mastering Biology. Portfolios included all work for the semester as well as self-assessment of study habits, exam performance, and overall performance in the course, and comments on the usefulness of Mastering Biology.

The breakdown of numbers reflecting class activities and performance is given in the following table:

Category	Number of students	Percent of class
90 - 100% Exam average	6	2%
80-89% Exam average	22	9%
70-79% Exam average	75	30%
60-69% Exam average	82	33%
< 60% Exam average	69	29%
90% or greater attendance average	180	73%
140 or more Friday writing points	135	54%
100 or more Friday writing points	214	87%
Full credit on Sheldon assignment	190	77%
80% or greater Mastering Biology average	148	60%
Portfolio Eligible (for 25 point bonus)	162	65%
Number recognized outside of class	84	34%

The Friday writing, Mastering Biology, and attendance scores pulled the overall class average up to 76.9%, so that according to the syllabus, the standard percentage cut-off values for letter grades were applied (90% = A; 85% = B+; 80% = B; etc.) The final exam was optional; students could accept as a final exam score the average of their three hour exams and their letter grade as indicated in a “what if” spreadsheet that assumed continued attendance and completion of all the remaining requirements after Thanksgiving break. Sixty-two students chose to take the final exam.

**Friday writing:** here, below, is that section of the syllabus that describes the Friday writing activities:

Writing exercises: Every Friday during the semester I will give small, extemporaneous, writing assignments. You will get 1-3 points (awarded subjectively on the basis of grammar, information content, etc.) for actually doing these assignments in class, and another 4-7 points (awarded subjectively on the basis of grammar, spelling, originality and insight) if you pick them up on time, do the follow-up writing, and return them on time.

Follow-up writing will consist of typing the paper (double-spaced) exactly as you wrote it in class, then evaluating your own performance with a single page of double-spaced typing that addresses matters of grammar, style, and the extent to which you were successful in doing the assignment. These writing exercise follow-ups are due the day the next one is given (the following Friday).

Each student was assigned a different generic name, and during the first week of class students were sent to the library to find some piece of primary literature dealing with this genus, copy it, and retain it for the semester as a supplement to the text. Several of the Friday writing prompts dealt with their individual genera. Here is a list of the writing prompts for the semester:

1. **082710** - Where would you have to go, and what would you have to do, in order to collect and keep a species of your genus as a pet?
2. **090310** – As best you can, from the information you've obtained so far, describe the life cycle of some species from your genus, including the habitat diversity that the various stages might encounter, the evolutionary adaptations shown by these stages, and the structural changes that occur during this life cycle.
3. **091010** - Do this exercise with one other person. Pick one group of campus landscape plants other than grass, a group that includes at least three different species, and fill both front and back of this sheet with a **DETAILED** description of the structure of these plants. (I was out of town on this day and this writing was a substitute for class.)
4. **091710** - If you were going to do an undergrad honors thesis on the species in your genus, what would be your main objective, the hypotheses you would test, and the supplies, equipment, and other resources you would need? (Assume you can easily get as many living specimens as required for the research.)
5. **092410** - Give Nicole a page of feedback on her talk [], both positive and negative, and be sure to give her advice on how to win a student paper competition at the next (national) level. (Nicole Searcey, undergrad TA, presented the research to date on *Dactylogyrus* species' distributions on fish gills, her honors thesis.)
6. **100110** - What are the ten most unusual and unique vocabulary words you have encountered while studying about your genus, and what have you done to learn what these words mean so that you can use them in daily conversation?
7. **100810** - Finish this letter. Fill up both sides of the paper. Watch the YouTube videos posted on Blackboard for 100810, then pick one of these organisms to fill in the blank. Do not once mention money, health, agriculture, politics, sex, sports, or religion.

Dear Mom and Dad (or insert the name(s) of whoever is paying for your college education):

I'm sure that you are thrilled to hear that after four years of college, I have now been admitted to Harvard Medical School. However, I'm writing to inform you that instead of going to med school, I'm spending the rest of my life studying \_\_\_\_\_ because . . . .

8. **101510** - Interpret this figure on the screen in terms of everything you have learned so far this semester in BIOS 101.



9. **102210** - This day was an entire class period spent in Morrill Hall.

Write a two-page, small writing, eloquent, literary, insightful, creative, and extremely biological essay on the subject: **The subtle differences between closely related forms.** Use at least two different galleries in the museum and at least two different groups of seemingly related organisms. It's okay to use specimens in the drawers in the Toren Gallery. Finally, check whether you were able to stay in the museum, studying specimens, for the entire class period without turning on or checking your cell phone (\_\_\_\_yes \_\_\_\_no).

10. **102910** - Draw a detailed and labeled textbook-type illustration of some structure associated with a species in your genus in the box provided, and fill the rest of the page with a discussion of mutant phenotypes that could arise in this structure and the way these mutations would affect the species.
11. **110510** (Guest speaker was scheduled for the following Monday.) Write ten conceptually important and insightful questions that you would like to ask our speaker on Monday, questions with a biological component but ones that you thought about after looking at his web site as instructed on Blackboard.
12. **111210** - Design five (5) pieces of clothing or jewelry using recognizable images of your genus and tell what you hope to accomplish by wearing this clothing or jewelry (it's okay to write on the back).

- 13 and 14** (20 points) were combined into a formal paper using the Sheldon Museum of Art permanent collections as the prompt material. The assignment was as follows:

Choose three or four different pieces of art in the permanent collection galleries (upstairs, the six rooms on the south), three if you do the paper by yourself, four if you do it with a partner. "Replace" three or four figures in your textbook with these pieces of art, explain the rationale for your choices, and tell why your chosen illustrations are better than the ones in the text (one page each). If you do it with a partner, each page must contain a paragraph in which one of you explains why you disagree with the choice and

would pick another piece of art (from the galleries) instead. You are allowed to “replace” any figures anywhere in your text. Be sure to cite both the name of the piece of art and the figure number and page from your text and provide only the figure and page number, no descriptions, of either the art or the text figure. The security staff will let you take your textbook, a notebook and a pencil (no pens) into the galleries.

In addition to the Friday writing, there was an attendance “quiz” every one of the last eight lecture days as part of the final optional contract. Those “quizzes” involved a ten-minute writing exercise on the subject of the lecture for that day.

**Portfolio:** The portfolio, for those eligible, consisted of a title page, table of contents, a copy of the syllabus, copies of all three exams and bubble sheets, a page of self-assessment for each of the three exams (addressing study habits, success, etc.), all their Friday writings and weekly self-assessments, a self-assessment of their overall writing experience and success, a self-assessment of their overall performance in the course, and a page of comments about Friday writing and Mastering Biology (plus an extra copy this last item, which I kept). Portfolios were examined but not collected, although two were collected for later conversion to pdf files. The sections had to be tabbed for easy checking, and the portfolio needed to be in a binder of some kind.

**Mastering Biology:** After some of the expected minor registration and start-up problems, most students were able to do the assignments without much trouble. There was some notable lack of enthusiasm for the overall activity, and comments about it at the end of the semester were mixed. I would certainly recommend MB, but I’d also recommend thinking in advance about the best way(s) to use the system, given one’s individual approach to teaching.

**Exams:** Exams were all multiple-choice. Students were given a test bank, via Blackboard, consisting of all my old exams for the past several years and encouraged to use those questions as study help. I took at least half the exam questions directly from these old tests, although with some minor wording changes to reflect the way particular subjects were presented in lecture. Students also had the answers to questions from fall, 2009, exams. Of the fifty questions on the third exam, 2010, forty seven were directly from old tests for which students had both the questions and answers (three genetics questions had the numbers changed), and three questions were from a Mastering assignment of ten questions covering two pages of their text. Students knew in advance that I would select three of the ten and they had three chances, using their book, to answer those Mastering questions correctly prior to the test. Class averages for the three exams were as follows: exam #1 – 68.5%; exam #2 – 65.3%; exam #3 – 66.6%. Of those students who took the final exam, five made higher than their average on the first three tests. The results of exam #3 are particularly interesting. My only conclusion from that test is: *even when students in a large, fall semester, BIOS 101 class in Henzlik auditorium are given all the questions and all the answers in advance, they still, as a group, cannot score above 70%.*

**Logistical burden:** It is always interesting, and in my opinion informative, to look back over the burden of teaching a large introductory class such as BIOS 101 in Henzlik Hall auditorium. For this section of BIOS 101, I had an undergraduate administrative TA, Nicole Searcey, who is a CPBS alum (two courses), is doing her undergraduate honors thesis research in our lab, and has presented her research at regional scientific meetings. Thus she is an experienced and mature undergraduate who is comfortable in front of an audience. Nicole handled most of the attendance quizzes and extemporaneous Friday writings; I handled all the follow-ups to the Friday writings. I estimate that Nicole spent about six to eight hours a week on BIOS 101. I spent about 24 hours a week, roughly distributed as follows:

Lecture preparation:	12 hours
Friday writing grading:	4 hours
Posting items on Blackboard:	3 hours

Waiting for software to load:	2 hours
Talking to students:	1 hour
Walking to Henzlik:	1 hour
Miscellaneous BIOS 101 activities:	1 hour

(Checking portfolios added about 4 hours the last week of class.)

**Subjective evaluation of student activities and performance in this class:** This class was not much different from other fall, BIOS 101, sections I have taught in recent years, although the progressive disengagement of students in general continued to be noticeable. It's easy to blame such disengagement on modernism, especially the isolating technology so pervasive on college campuses nowadays, but my advancing age (the intimidation factor) also could be a problem with an audience of ~250 18- and 19-year olds in their first semester at a university. E-mail communication was extensive, but use of the Blackboard discussion forum was not. I probably received 5 e-mails a day from students, mostly about missing class and grades. The banning of cell phones and laptops produced an interesting behavior, namely, that of coming in late and sitting on the floor at the back of the auditorium (with laptops open and on, and cell phone text message panels showing). But at least they showed up. Evidently the attendance requirement, fulfilled by short 1-3 minute "quizzes," inspired some feeling of responsibility among a large number of students.

As in virtually all previous BIOS 101 classes I have taught in the last 15 years, there were probably 30-50 students, mostly women, who, in my opinion, had set their career goals far below their capacities and needed to be biological sciences majors, engaged in undergraduate research, teaching labs, and participating in the field program. It seems obvious from conversations with such students, and from reading their information sheets, that family, high school counselors, church, and other personal circumstances tend to shape such career decisions, as well as their perceptions of what kinds of intellectual activities should take place at major universities. In the recent past, a few students have gotten angry when I made the suggestion that their abilities would certainly support higher aspirations. In this class, there were at least three students, in this category, who avoided any contact whatsoever with their faculty member except for times when bubble sheets were returned. In this class, out of the top 25% (62 students), 45 (75%) were women, many if not most of them as described in this paragraph.

There also were a few real slackers and a couple of belligerent guys.

The writing done by this class was, as a whole, excellent and interesting. A satisfying number of students worked hard at improving their written communication skills every week, although there is no way to quantify or prove this assertion. But when a senior faculty member with extensive publishing experience reads several thousand pages of student writing in a 15-week period, then that individual's sense of student accomplishment is pretty accurate (there is no way to quantify this last assertion, either!). Nevertheless, I honestly believe that when students do what we do, namely, write regularly and assess our own performance, also regularly, then they do become better writers over time, and the collective feedback they get starts to make more sense than it would otherwise. I did not "grade" papers because I've come to believe, based on experience of the past several decades, that such "grading" produces no change whatsoever in student communication skills. I did make a few marks on each paper and gave them collective feedback (available on request), but I'm convinced that the weekly task of seriously evaluating one's own work tends to be a better mentoring device than any "grading" I might do. The marks on their papers consisted of circles (bad grammar, misspellings, incomplete sentences, etc.), brackets (interesting statements or ideas), stars (really nice insight or analysis), and a few extensive notes.

**JJ's final comments about BIOS 101 in general:** I have taught large introductory classes (BIOS 101 or equivalent) every fall semester (except two) since 1966, and every spring semester until 2006 (BIOS 112, BIOS 204/103). I have taught these large classes in Henzlik, CBA, Beadle, Military and Naval Science, Bessey, Burnett,

Love Library, and Morrill Hall (and if I were religious, I'd say "thank God never in Hamilton"). The fall, 2010, section of BIOS 101 was my last assignment in this course, ever, so perhaps it is of value to pass along some comments about General Biology as taught in Henzlik Hall auditorium. These comments can thus be considered somewhat of an exit interview. There is also a lot of material relative to large class instruction on my web site: <http://bsweb.unl.edu/labs/janovy>.

Writing in large introductory classes: For the past 35+ years I have given serious writing assignments in the large introductory classes (~260 students). This writing has been assigned for a variety of reasons, the main one being my early conclusion that multiple choice tests were mainly selective devices rather than teaching tools. There were three objectives of this writing: first, to diversify the learning modes in class; second, to teach things about biology in students' every day lives that I could not teach from the front of Henzlik auditorium; and, third, to gather information about student skills, information that shaped the way I presented material in class and phrased exam questions.

These assignments had to have the following characteristics:

1. Each student had to have an individual item, e.g. a specimen, an individual picture, an individual campus plant, etc., although the whole class had the same assigned writing task.
2. After the Internet became a functional tool, I had to change the nature of our writing to elicit originality and deprive students of the opportunity to use the Internet (see prompts above).
3. Prior to Internet functionality, the papers were three pages, typed, double-spaced, with one-inch margins, and students were never allowed to mention money, politics, health, agriculture, the military, sex, sports, or religion (see the web site above for some examples of topics). We typically did either four or five of these papers in a semester.
4. Papers were "graded" as done/not done. In some cases, e.g., with BIOS 204/103 the majors' courses, students were asked to do papers over if they did not meet the demands of the assignment. I tried to put a comment or two on each paper, although a lot of these "comments" were just brackets, circles, or stars. Students knew what these marks meant. Routinely in BIOS 204/103, a few students dropped the course the first time they were asked to do a paper over. These students were not missed.
5. I tried very hard to make the assignments such that if students really tried to do them, and to the extent asked, then I had complete confidence the students would come away from the experience educated about biology in a way that I could not accomplish from the front of Henzlik Hall auditorium (or any of the other auditoriums I've taught in).
6. In recent years, the portfolio was added as an extra credit option, provided students had accumulated enough points in other class activities. This activity was thus intended to modify student behavior, at least in my classes, and it worked pretty well (see table above). The main idea behind this portfolio was to encourage students to place value on their own work. Based on student behavior, especially with respect to picking up papers and developing the portfolio, I'd say that a significant fraction of our students place little or no long-term value on their work, especially written work. This lack of respect for their own work is, in my opinion, a major impediment to the achievement of educational goals appropriate for a large university.
7. A fairly detailed description of writing in a variety of courses is provided on the web site given above.

Information about students: From my first large lecture class (fall, 1966; TThS 0730; Love Auditorium, 362 students) it became very obvious that such classes contained some very talented people who could become professional biologists, given the correct mentoring. Over the years, my techniques for discovering such potential biologists changed in accordance with our curricular changes and my teaching assignments, but they always involved a combination of information, collected on the first day of class, and personal interviews with students in the top 25% of the class. Some time during the late 1980s, when the Oldfather Hall pre-health advising system began to exert undue (in my opinion) influence over the lives of students, information sheets became a little more detailed (see example—last page of syllabus). Thus I have acquired a rather substantial amount of information about our BIOS 101 students, although that information is filed as “experience” instead of in a paper or electronic file. Those information sheets get shredded at the end of each semester. Here, based on personal interviews and information sheets from about 2500 of our entering freshmen over the past decade, is my assessment of the situation:

1. In every class, about 10%, or ~20-25 students, mostly women, have no business being in BIOS 101 and instead belong in the majors’ track. About 20%, or 40-50 students, again mostly women, have set their career goals far below their capacities and intellectual abilities. The blame for this situation lies in a variety of places, including high school counselors, although the Pre-Health advising system in Oldfather Hall carries a very large share of it. Of the top 60-80 students in any BIOS 101 class, about 75% of them will be women completely suited for STEM (Science, Technology, Engineering, and Mathematics) careers, although when told that, most smile and leave; a few get angry.
2. The undergraduate advising system at UNL allows 4-Year Regents Scholars and National Merit Scholars who are closet pre-meds into BIOS 101. Fortunately for me, it has been fairly easy to discover these students and bring them into my lab as honors thesis researchers, some of whom end up publishing their work and/or going on to graduate school and academic careers. I estimate that the School of Biological Sciences lets between five and ten of these types slip through our fingers every year. If “captured,” within a decade there would be fifty to a hundred such young scientists publishing, in graduate programs and post-doc positions all over the world, and well on their way to elevating the scholarly profile of UNL-SBS.

Comments on technology: It has never been obvious to me that technology is a substitute for personal interaction, and that is certainly the case with the advent of clickers, PowerPoint, and podcasts. Even though I use technology quite a bit, I also use a variety of tricks to personalize instruction, remind students that we are [together] engaged in a human activity, and expand their vision of biology outside the classroom. I have never for a minute believed that memorizing the citric acid cycle and learning how to calculate number of resulting ATP molecules produces a scientifically literate population—the goal of any General Biology course—regardless of how appreciative students are of the certainty involved in memorizing chemical processes. Content is essential but not sufficient to produce science literacy; process (see section about writing, above) is essential but not sufficient. But between the two, process makes a difference in student behavior, whereas content alone allows for quick disengagement after finals week. Thus electronic delivery of content can easily produce the illusion of teaching/learning, especially when assessed by some standardized instrument (e.g. Pearson’s Mastering Biology), but the question of effective scientific literacy always remains. Anyone who teaches upper division courses (e.g., BIOS 385, Parasitology, and BIOS 487, Field Parasitology at Cedar Point Biological Station) and asks for certain kinds of performances from students can tell immediately what those students have been asked to do by other faculty members; in my experience, especially in recent years, electronic content delivery alone or in massive doses (at the introductory level) never seems to produce the kind of upper division student we would like to see in class.

Information technology also is/was, at least in my case, a massive time sink. Several hours on a PowerPoint presentation, which produces nothing in students' notebooks, is not the same as walking into a classroom, picking up a piece of chalk, and engaging an audience that is taking notes at a human pace.

Comments on presentation and stage presence: Over the years I have had the opportunity to watch many of my fellow instructors perform in a variety of settings and rooms (Henzlik, CBA, Hamilton, Morrill Hall, Nebraska Union, etc.) As a general rule, we do not pay much attention to simple show-biz matters like stage presence, dress, posture, what your screen figures look like from the back of the room, how to use the pointer, composition of slide graphics, and interactions with the audience. Instead, we often seem to focus on content, on what we believe students should know, rather than on ourselves as role models and the importance of biology in our daily lives. We assume that PowerPoints, or whatever we put on the chalkboard, will serve to capture and hold student attention. Nothing could be further from the truth. No prof can compete with the deluge of electronic communications our students receive minute by minute. I believe that we are at the point in the evolution of SBS where as a group we [faculty members] need to decide our role in national affairs, the two extremes being (1) to produce a scientifically literate society and capture the human resources needed to achieve that goal, or (2) to distance ourselves from our most reliable supply of human resources (the ~2000 18- and 19-year olds who walk into our front door every fall semester), focus our talents on our research and reputation. As individuals, and as a group, our performance in the introductory classroom reflects these extremes, whether we realize it or not.

Comments on student reading skills: Some have them; an increasing fraction does not. For the third exam in my BIOS 101 class, fall, 2010, my students had virtually all the questions, and the answers, beforehand, and the class average was still 66%. A noticeable number struggle with the information on Blackboard, and with every assignment, I get comments such as "I don't understand what we're supposed to do." E-mail communications, increasingly sent from smart phones, often reflect a complete ignorance (or avoidance) of punctuation and grammar. My smart phone has all kinds of options for capitalization and insertion of punctuation marks; I assume theirs must also. I also routinely received e-mails without names included, or with only first names, and I even get papers with only first names. I believe these electronic communications reflect lack of reading skills because they suggest students are not thinking about either the information content of their messages or how these messages are going to be read. The lower third of any class is in real trouble, in my opinion, because these students simply do not have the reading skills to interpret simple questions and statements. These students are not bad people, nor are they necessarily failures in life, but they are not likely to acquire critical thinking skills on their own after college, especially when faced with political issues that require careful analysis.

Comments on classroom management: Classroom management is the number one problem in large classes. I know, it seems like baby sitting, or pandering to childish impulses on the part of students, or making an effort to overcome their immaturity, but if you don't accept classroom management as your first priority, then there's an excellent chance you'll end up simply babbling in front of a disengaged audience for fifteen weeks. If I had any advice for new faculty members, it would be to look yourself in the mirror and decide what kind of classroom management techniques you are willing and able to use then develop those techniques as part of your professional repertoire. Here are mine:

1. Learn as many names as possible as quickly as possible. The fact that I award 10 points (extra credit, on top of 800 regular points) to students I can recognize outside of class by mid-semester helps in this effort. Once I learn a few names, then I use those names in class if the individuals are talking, using their cell phones, etc. Calling students out by name, asking if they have a question, can be quite effective at



capturing attention of an entire class. However, I also call them out by clothing if they're being disruptive and I don't know who they are.

2. I do not allow laptops in class and I tell students from the first day, as well as in the syllabus, that cell phones are to be turned off and put away. I don't spend much time monitoring this problem, but I do pay attention to it and call out students if I see them texting.
3. A few years ago, after some extended conversations with Norm Smith in Geology about attendance (he was amazed that mine was as high as 66%), I started taking attendance, first by use of clickers, then, when the clicker system got too time-consuming, through frequent attendance quizzes—one or two sentences about some item on the screen—with a total of 100 points (out of 800) for the semester. My average attendance for the past several years has been about 85% as a result (still nearly 40 people absent on any given day).
4. About once every other year, I've kicked people out of class for talking and laughing, even after being asked to stop; that works pretty well.
5. I find some way to break up almost every class for a couple of minutes in the middle, usually with some activity that involves use of the hands. I try to avoid any cutesy stuff like is used in some Chemistry classes, and whatever students do needs to have a personal meaning. A good example of such activity would be writing down their own nucleotide sequences for some imagined gene, a string 30 nucleotides long. We can do a lot of things later with this item in their notebooks (transcribe it; translate it; make mutations; use some of them in making a phylogeny, etc.)
6. I use a lot (a LOT!) of outside resources in class: ingredients lists on junk food, campus vegetation, both museums (Morrill Hall and Sheldon), newspaper stories, dead birds, leaves, or insects picked up on the way to class, etc.
7. Television is a great medium for studying the way others use their position in front of an audience; I do watch speakers and study their techniques.
8. The hassles, frustrations, and irritating problems seem to be distributed about like macro-parasites in the sense that most of them are concentrated in a very few students, and the vast majority of students are doing just fine regardless of their grades (see also Malcolm Gladwell's February 13, 2006, story "Million-Dollar Murray," and Atul Gawande's January 24, 2011, story "The Hot Spotters," both in *The New Yorker*). Once this aggregated distribution became obvious (in about 1967), I started focusing my main attention on the upper third of the class, and even though I still dealt with the problem students, the experience was not a particularly negative one, but rather an educational one from which I learned a lot about the system.
9. That small book, *OUTWITTING COLLEGE PROFESSORS* (<http://wwwcreatespace.com/3425284>) is an expansion of materials in my syllabus (example from the fall, 2010, BIOS 101 attached). In general, if five students, out of 250, buy that book and take the advice in it, then BIOS 101 becomes much more interesting and rewarding for the prof, simply because of a few students actually approaching school in a serious manner (again, the macro-parasite distribution phenomenon, but in a positive way).

General comments re exams: Many years ago I started providing students with copies of all my old exams, first as items in a library reserve folder (pre-Blackboard) then on Blackboard. Some students used these test question banks fairly effectively as study aids, but statistically the test question banks did not seem to make

much of a difference in class averages. After my first year or two, I quit giving makeup exams and simply pro-rated scores for students missing tests, regardless of the reason. Once I started using Friday writings and attendance, I started making the final exam optional, provided attendance was 85% for the days after the third exam. Students had daily writing, usually 10 minutes on the lecture topic of the day, each of those last few class days. I was amazed at how well they wrote during these last days of the semester, and how well they interpreted the previous 40 minutes of lecture, extemporaneously, as a group. This aspect of their performance was quite unexpected, given the performance on exams as a group. With the final optional, about a fourth of the class (50-60) usually opted to take it, and out of that fourth, about five or six students per year would improve their grades a half-letter.

Over the years, I tried various kinds of questions on large class exams, including a few short answer ones, series of questions that explored a particular topic in depth, questions about supplemental reading, matching, labeling diagrams, etc., but always returned to multiple choice. Our papers and writing always seemed to me to accomplish what essay exams might have accomplished, and were a hell of a lot easier to read and “grade” than scribbled essays done during an hour exam in a large auditorium.

Human resources: If I had any parting comment about BIOS 101 at UNL, it would be that in general, my interactions with students in that course seem to reveal a kind of careerism and vocational school view, on the part of students and probably advisers, that should not be characteristic of a large university. Someone should be telling our entering freshmen that they have four or five years to be real college students and forty or fifty years to be something else. Alternatively, I really would like to read formal statements from all the regional health care professional schools and programs (medical schools, nursing, physical therapy, occupational therapy, dental hygiene, etc., etc.) stating explicitly that *they do NOT* want students who have a college degree, who have done undergraduate research, developed interpersonal skills through teaching labs, spent time at Cedar Point, etc. I have yet to hear or read such statements; instead, I have heard literally hundreds of truly excellent students, tell me: I’m only going to be here two years . . . etc. These are young people who need to be encouraged, *BY THE INSTITUTION*, to stay in school, engage in independent study, interact with faculty members of their choice, and sample as much of the richness available at a major university as they can prior to obtaining a degree.

JJ

John Janovy, Jr.

<http://bsweb.unl.edu/labs/janovy>

**Instructors:** John Janovy, Jr., 424 Manter Hall; [jjanovy1@unl.edu](mailto:jjanovy1@unl.edu); <http://bsweb.unl.edu/labs/janovy>

Nicole Searcey, administrative assistant, [nicole.searcey@huskers.unl.edu](mailto:nicole.searcey@huskers.unl.edu)

**Text:** Campbell, Reece, Taylor, Simon, and Dickey, *BIOLOGY: Concepts and Connections*, 6<sup>th</sup> Ed. (Pearson/Benjamin Cummings)

**Suggested additional Reading:** Janovy, *Outwitting College Professors*, 3<sup>rd</sup> Ed. ([amazon.com](http://amazon.com) or [createspace.com](http://createspace.com))

Welcome to the University of Nebraska. I hope your time here is well spent and that the university experience turns out to be a positive one. BioSci 101 is intended for first year students who are not majoring in Biological Sciences. Consequently, this course enrolls people from a wide variety of backgrounds and with an equal diversity of goals and interests. In addition, biology is an exceedingly broad subject; therefore, although lecture content will refer primarily to materials from the text, you should expect to occasionally hear, or participate in, discussion of current scientific issues that affect your daily life.

**What to expect in this class:**

- (1) I usually have three lectures a week, mostly explaining material in the book and expanding on that material when appropriate. Facts, vocabulary, and diagrams usually come from the book, but the meaning, significance, and interpretations will come mainly from material presented in class.
- (2) You will have weekly writing exercises done in class and you will be asked to pick up your papers and do some additional work on them within a week. All papers will be plastic bins outside my office door.
- (3) You will also have at least 25 pop quizzes (attendance checks), so always have at least a couple of blank sheets of 8.5" x 11" paper with you (recycled is okay, so long as it's blank on one side).
- (4) You will have a series of online homework assignments done using Mastering Biology, a system developed by your textbook publishers. This homework will need to be done on a regular basis and submitted by the due dates in order to get credit for it for your final grade.
- (5) You may be asked to write short papers in addition to, and sometimes instead of, coming to class one or two times during the semester. These paper assignments are likely to seem strange and challenging. Don't be surprised by an unusual class period when we do something different yet still quite appropriate for a university biology course.
- (6) Some student(s) will earn extra points by asking excellent questions, or demonstrating other kinds of intellectual leadership. I may also turn the microphone over to students periodically.
- (7) The material will be integrated from the beginning (see Fig. 1.1 in your text). Both lecture and readings are likely to include information from sub-cellular to ecosystem levels, from several places in your book, and from the campus and the media. I suggest considering the index to be the rough equivalent of Google, in the sense that you can search for terms in the index and come up with information about those terms. I will

try to tie these subjects together, and you are expected to try to do the same.

- (8) You will be treated as if you have come to a major university (which you have) and will be expected to behave accordingly in this auditorium. If you are being disruptive, talking excessively, reading the newspaper, talking on your cell phone, lost in a dream with your iPod plugged into your ears, etc., you probably will be asked to leave, maybe even asked to drop the course. Please turn off your cell phone and put your laptop away when class starts.
- (9) You will have to take notes, lots of notes, paying particular attention to interpretations of material from the text and to our attempts to integrate the various aspects of biology into a single big picture.
- (10) I will try to learn as many of your names as possible; I greatly appreciate your help and cooperation in this effort.

### **Learning Outcomes for this class:**

As a result of taking this class, you should be able to clearly explain the following to your friends and relatives, including your present and future children, who have not taken a university-level biology course:

- (1) The fundamental nature of science and of biology.
- (2) The idea of a species, and some sense of biological diversity on Earth.
- (3) The design of a typical experiment and analysis of the results.
- (4) The biological roles and functions of the major ingredients indicated on labels of processed food.
- (5) The structure of a cell and the functions of all the cell organelles typically illustrated in an introductory biology text.
- (6) Mendelian inheritance of dominant and recessive traits and the calculations used to predict probabilities of genotype.
- (7) The evidence for evolution and why evolution is the central unifying theme in biology.
- (8) The evolutionary principles as outlined in an introductory college biology text.
- (9) The flow of energy, chemical elements, and molecules through an ecosystem.
- (10) The role(s) that humans play, and have played, in modification of the Earth's biota and life support systems.

### **COURSE ELECTRONICS, OR WELCOME TO THE INFORMATION AGE:**

Blackboard: UNL has a web-based Course Management System called Blackboard available for use by students and faculty members. I will use that software to send e-mails, post grades, announcements, lecture PowerPoint

shows, and podcasts. You get into this software through the web site <http://my.unl.edu>. If you are registered for this class you can get into Blackboard for this section. Please get up to speed on Blackboard as quickly as you can; it's not particularly difficult, but you will need access to the Internet in order to use it. Plan to check Blackboard every day for any announcements relative to this class.

**Mastering Biology:** This software and its associated content are products of your textbook publisher. I decided to use Mastering this semester based on comments from students and faculty members in other introductory courses. If you did not buy a new book, then you will need to purchase Mastering separately online. You will also need a course ID for this section of BIOS 101, and an individual ID that links your homework result to my roster. **The course ID for this section is:**

**MBJANOVYJR99234**

Your individual login identifier will be provided once most students have enrolled. It will be a 6-character code that appears when you check My Grades with Blackboard. This identifier will be something like (for example): W76FV9. When you login to Mastering Biology, you will be prompted with a box that looks like:

**PUT IN THE CODE YOU HAVE BEEN ASSIGNED BY ME FOR THIS COURSE (e.g. W76FV9):**

**Don't know what to enter? Contact your instructor for help.**

Your individual 6-character code goes into that box.

### **Attendance:**

Attendance is required and accounts for about 13% of your final grade. The quickest way to get into grade trouble in a large university class is to quit coming to school. You are responsible for all of the material presented in lecture and assigned from the text. However, I will try to put all lectures up on Blackboard both as \*.wma and as \*.m4a files, as well as podcasts, and all the PowerPoint shows up as both \*.ppt and \*.pdf files. Your attendance grade is calculated using pop quiz papers and Friday writings; you can expect at least 25 short 5-minute pop quizzes and extemporaneous writings the last fifteen minutes of class on Fridays.

### **Questions:**

Questions are expected. Although I have a lecture schedule, it is not so rigid that we can't spend an entire period on class discussion or in answering questions. Someone please raise his or her hand and tell me to slow down, spell words, or repeat if I am going too rapidly.

### **Grading:**

Your grades are calculated on the following basis:

- (1) Hour exams – three @ 100 points each = 300 points
- (2) Final exam – one @ 160 points = 160 points
- (3) Written assignments 14 @ 10 points = 140 points

(5) Mastering Biology (total)	= 100 points
(5) Attendance	= 100 points
TOTAL	= 800 points
PORTFOLIO BONUS POINTS	= 25 points

Hour exams: The tests may include multiple choice and matching questions, diagrams to label or interpret, and short essays. There may also be a “critical and higher order thinking” section on each exam, consisting of 5 questions that explore a subject in depth. **There is a test question bank on Blackboard.**

Exam questions: I will take as many of the exam questions as I can from the question bank posted on the Blackboard web site for this course, although I may modify them slightly to account for differences in presentation and textbook use. I may ask you to write some of your own exam questions and provide not only the answers but also the rationale for the answers (on Blackboard).

Pop quizzes: You will have at least 25 pop quizzes, consisting of a five-minute extemporaneous writing. I will calculate your attendance grade from these quizzes. If you want proof of attendance, be sure to pick them up; they will be in plastic bins beside my office door. Sorry, I don’t have a more efficient way to return these quiz papers.

Writing exercises: Every Friday during the semester I will give small, extemporaneous, writing assignments. You will get 1-3 points (awarded subjectively on the basis of grammar, information content, etc.) for actually doing these assignments in class, and another 4-7 points (awarded subjectively on the basis of grammar, spelling, originality and insight) if you pick them up on time, do the follow-up writing, and return them on time.

Follow-up writing will consist of typing the paper (double-spaced) exactly as you wrote it in class, then evaluating your own performance with a single page of double-spaced typing that addresses matters of grammar, style, and the extent to which you were successful in doing the assignment. These writing exercise follow-ups are due the day the next one is given (the following Friday).

Mastering Biology: This semester is my first one using this online system; the main reason I’m using it is because of positive reactions from students in other courses. You will end up with a total number of points accumulated during the semester for doing this homework, and I will convert that total to a fraction of 100 for the purpose of calculating your final grade.

Portfolio Bonus Points: If, some time during the last week of the semester, you show me your complete set of work for this class, assembled according to instructions on Blackboard, and you have received at least 120 of the 140 points available through writing assignments during the semester, at least 90% of the points available through Mastering Biology, and 90 of the 100 attendance points, I will add 25 points to your total for the semester. Detailed instructions for preparing your course portfolio will be provided on Blackboard.

**Grading scale:** If the class average is 75%, that average is middle C. I reserve the right to scale grades up if the class average falls below 75%. If the class average is 75% or higher, then an approximate standard scale applies (90% = A, 80% = B, etc.). If you end up with 720 points I will give you an “A;” with 640 points you are guaranteed at least a “B;” etc.

**Makeup exams:** I give no makeup exams. If you miss a test because of illness or personal emergency, I will not count that test if you have either a physician’s note indicating you were ill, or have some other documentation of a real emergency. If you miss class because of athletic competition, I need to have the letter from your coach and I need to be reminded of that letter frequently and as the semester nears its end. If possible, I will arrange for you to take an exam with you on any university-sponsored trip and have it administered by a university official.

**Extra credit:** I reserve the right to provide opportunities for extra credit, which will appear as points simply added to your total. These opportunities may include writing some of your own test questions, contributing to exam preparation via Blackboard, exhibiting intellectual leadership in class, sustaining class discussion (see below), etc. If by Thanksgiving break I am able to recognize you on the street, outside of class, by name and face, then I will add 10 extra credit points to your total.

**Please decide *this morning* that you are going to come to class every day, take notes seriously, ask questions, participate in class discussions, take all the exams and quizzes, do all the Friday writings and follow-ups to the extent assigned, do your Mastering Biology homework, take advantage of extra credit opportunities, make sure I can recognize you outside of class, and get help early if you need it.**

### **Class discussion:**

If a group of three or more students initiates a serious class discussion of current events, conducted within the context of material we are covering, and if ten or more additional students actually participate in this discussion, I will add 5 bonus points to the grade of everyone who is in class that day. In order to get these points it will be necessary for you all to be quiet and attentive and to treat your fellow students with respect (but I don’t care how lively the discussion gets).

### **Lab:**

BioSci 101L is a separate course from BioSci 101 and I have no responsibility for, or control over, your lab grade. I will try to cover certain topics, e.g. cell biology and genetics, before they are covered in lab. Dr. Jon Sandridge is the General Biology Laboratory Coordinator. His office and the Bios 101 lab office are located in room 101A Manter Hall; his telephone number is (402) 472-0620; and, his e-mail is [jsandridge2@unlnotes.unl.edu](mailto:jsandridge2@unlnotes.unl.edu).

### **Office hours:**

My office hours are MW after class and Th afternoon 1:30-3:30. You can call me at 472-2754 (office), or leave a message at 472-2720 (BioSci office) or 489-4369 (home). If you leave a message on my home or office phone, please speak slowly and clearly, and leave your name and phone number. I also have a mailbox in 348 Manter Hall (BioSci office, campus mail zip is 0118). My e-mail is [jjanovy1@unl.edu](mailto:jjanovy1@unl.edu). I am available by appointment about any day, including late in the afternoons (except on Friday). If you see me out on campus and

I don't seem to be doing anything important, feel free to introduce yourself and ask any questions you may have about biology.

**Study hints:**

- (1) Make a vocabulary list. Someone ask me about how to make and use such a list (I will also put some vocabulary lists up on Blackboard).
- (2) Find a study partner, or several, and use the vocabulary in your daily conversation.
- (3) Seek individual help early if you feel completely lost.
- (4) DON'T feel embarrassed if you are not doing as well as you think you should be; seek help.
- (5) Use all the resources available, including those that may be on Blackboard.
- (6) Use the old exams as study guides.
- (7) Practice thinking like a biologist, talking like a biologist, and acting like a biologist.

**About your instructor:**

John Janovy, Jr.

Paula and D. B. Varner Distinguished Professor of Biological Sciences

BS in Math (1959), MS in Zoology (1962), and PhD in Zoology (1965); University of Oklahoma; post-doctoral research, Rutgers (1965-66).

Research interests: parasitology, especially ecology of parasitism and evolution of parasite life cycles, with focus on the protistan parasites of insects and the helminth parasites of small fish. There are usually several students doing research in my lab.

Other courses taught: Parasitology (BIOS 385, spring semesters), Invertebrate Zoology (BioSci 381, fall semesters), Field Parasitology (BioSci 487/887, Cedar Point Biological Station, Lake McConaughy, NE).

Other information: My wife Karen is the Education Coordinator at the Sheldon Museum of Art; we have three children: CJ – Director of Communications for the University of Kansas Medical Center; Jena – Senior Enterprise Editor for ESPN.com; and John III – A real estate agent with Woods Brothers in Lincoln. I read voraciously and broadly, play golf regularly (but not spectacularly!), and do creative writing every day in addition to research and scientific writing. My complete CV is on the web site below.

Web site: <http://bsweb.unl.edu/labs/janovy>

Blog: <http://talkparasites.blogspot.com>



**General advice on how to maximize the value of the education you receive at the University of Nebraska (these suggestions will cost you absolutely nothing except a little time):**

- (1) Make sure every instructor you have knows your name, and make sure that instructor knows you and your work well enough so that he/she can write a letter of recommendation for you if necessary.
- (2) Simply decide today that you are not afraid of, or intimidated by, faculty members, no matter how obnoxious or wacko they seem, and regardless of whether their “values” or political views are consistent with yours.
- (3) Pay attention to world events, especially those with a cultural component. Try to understand why these events take place, even though your courses may not deal with anything other than specific subject matter having nothing to do with global politics or economics.
- (4) Visit the museums on campus about once a week (free with student ID). Talk to your friends about what you see in those buildings. Visit the Sheldon Gallery regularly and be able to talk intelligently about the works there, as well as the sculptures on campus.
- (5) Pay attention to the campus landscaping; read the labels on the trees and plants. Talk about campus landscaping and vegetation with your friends.
- (6) Read some high quality magazine fairly regularly. I suggest *The New Yorker*, *Harpers*, or *Atlantic Monthly*. Ask your instructors for a reading list of non-fiction books and read some of the items on such lists.
- (7) Talk to your parents or guardians about the ideas you are encountering at UNL.
- (8) Do *something* original and creative (poetry, music, sketches, etc.) on a fairly regular basis.
- (9) Go to free lectures and recitals when you have the opportunity. Once you get there, turn off your cell phone, be a quiet and attentive audience member and stay through the whole performance.
- (10) Talk to your fellow students. Find out who are the most challenging faculty members in the arts, humanities and social sciences, and enroll in those teachers’ courses. *Always choose instructors instead of course numbers whenever possible.*

---

**GENERAL BIOLOGY LABORATORY ANNOUNCEMENT (Bios 101L)**

The laboratory is an integral part of the General Biology course. It is designed to provide you with a series of experiments and observations which illustrated many of the basic biological principles discussed in lecture. Efforts have been made to coordinate the sequence in which lecture and lab materials are presented. In general, the basic background information necessary to carry out each week’s lab exercise will be covered in

lecture prior to the lab exercise. ***The General Biology Laboratory is a 1 credit hour course (Bios 101L) which must be taken concurrently with lecture (Bios 101).*** Your lab grade will NOT be averaged into your lecture grade.

Please note the following policies:

1. If you drop or withdraw from Bios 101 lecture you must also drop or withdraw from Bios 101L lab. Conversely, if you drop or withdraw from the Bios 101L lab you must also drop or withdraw from Bios 101 lecture.
2. Attendance will be taken at each lab meeting. If you miss more than 2 lab sections, you will automatically receive a grade of F for the laboratory (Bios 101L).

The General Biology Laboratory Coordinator is Jon Sandridge. His office and the Bios 101 lab office are located in room 101A Manter Hall; his telephone number is (402) 472-0620; and, his e-mail is [jsandridge2@unlnotes.unl.edu](mailto:jsandridge2@unlnotes.unl.edu). All questions concerning the laboratory should be addressed to Dr. Sandridge.

---

**LECTURE SCHEDULE.** In the following schedule, biology is presented in a sequence that is intended to build upon itself, the earlier lectures providing background information, ideas, and concepts necessary to understand the topics presented later in the semester. Biology is a highly integrated field of study; for this reason I may select readings from several places in the book so that you will have both facts and context relevant to the topic. In the Reading column, the entries are the textbook sections. The sequence of topics also is dictated, at least somewhat, by the laboratory.

Week	Topic	Pages	Questions, Subjects, and Issues
	<b>SECTION I</b>		<b>SCIENCE, BIOLOGY, AND BIOLOGICAL AWARENESS</b>
1	What is science?	8-12, 120	What is the meaning of scientific literacy?
1	What is biology?	1-7, 307-309, 763-765	How do scientists study living organisms?
1	What is evolution?	8-9, 258-259, 299, 300-301	
1	Species concept	276-281	What is a species?
2	Thinking like a scientist	281-291	How do biologists view life's diversity?
2	Thinking like a biologist	Fig. 1.1, 52-57, 415-419, 627, 688	How does one acquire an integrated view of biology, from subcellular to ecosystem levels?
3	Organismic biology	Chapters 16-10	Biological awareness – seeing the world as a biologist sees it.
3	Organismic biology	Chapters 16-10	Biological awareness – seeing the world as a biologist sees it.
3	Organismic biology	Chapters 16-10	Biological awareness – seeing the world as a biologist sees it.
	<b>SECTION II</b>		<b>CELLS – THE UNIT OF LIFE</b>
4	Cell chemistry	Chapters 2 & 3	What's in junk food?
4	Cell chemistry	Chapters 2 & 3	What's in junk food?
4	Cell chemistry	60-62	What do cells do with the materials in junk food?
5	Eukaryotic cells	Chapter 4	What is meant by the term "cell"?
5	Eukaryotic cells	Chapter 4	What is meant by the term "cell"? (cont'd)
5	Eukaryotic cells	Chapter 4, plus some other text figures,	The diversity of eukaryotic cells.
6	Cell activities	Ch. 5, 6, 7 (selected parts)	How you and all other organisms process the environment.
6	Cell activities	Ch. 5, 6, 7 (selected parts)	How you and all other organisms process the environment.
6	Cell activities	Ch. 5, 6, 7 (selected parts)	How you and all other organisms process the environment.
	<b>SECTION III</b>		<b>GENETICS AND INHERITANCE</b>
7	Genetics	128-132, 134	How do living organisms grow?

7	Genetics	136-143	What should an educated citizen know about sex?
7	Genetics	266-267	Population thinking.
8	Genetics	Ch. 9-14 (selected parts)	Why is phenotype so important?
8	Genetics	Ch. 9-14 (selected parts)	Why is phenotype so important? (cont'd)
8	Genetics	Ch. 9-14 (selected parts)	What is genetic information?
9	Genetics	312-313, 263, 307-312	Molecular genetics and evolutionary biology.
9	Genetics	332, 344, 369	Molecular genetics and evolutionary biology.
9	Genetics	385	Tree thinking.
	<b>SECTION IV</b>		<b>EVOLUTION – THE CENTRAL UNIFYING THEME OF BIOLOGY</b>
10	Evolution	Ch. 13-15	What is evolution?
10	Evolution	Ch. 13	What is the evidence used to support science's interpretation of life's history?
10	Evolution	Ch. 13	Why do biologists consider evolution to be a fact?
11	Evolution	Ch. 13	Population genetics and mutation.
11	Evolution	Ch. 13	Co-evolution and speciation.
11	Evolution	Ch. 13	Cladistic methodology and the underlying ideas; testing of evolutionary hypotheses.
12	Evolution	400-408, 734-737	Are humans evolving?
12	Evolution	Ch. 16 (parts)	Why is the evolution of disease-causing organisms of importance to people in the United States?
12	Evolution	Blackboard	Who is actually hurt by the teaching of evolution?
	<b>SECTION V</b>		<b>INTERACTIONS BETWEEN ORGANISMS AND THEIR ENVIRONMENTS.</b>
13	Ecology	Ch. 34	What is meant by the term "environment"?
13	Ecology	Ch. 37	The flow of materials.
13	Ecology	Ch. 38	Are humans destroying the Earth?
14	Ecology	Blackboard	The relationship between Earth's history and current political conflict.
14	Ecology	Blackboard	To what extent do natural phenomena override government actions?
14	Ecology	Blackboard	What power do individuals have to direct their own future and that of their children?
	<b>SECTION VI</b>		<b>GETTING ACQUAINTED WITH YOUR NEIGHBORS</b>
15	Organismic biology	Ch. 16-19	Who shares the planet with us?
15	Organismic biology	Ch. 16-19	Who shares the planet with us?
15	Organismic biology	Ch. 16-19	Who shares the planet with us?

	<b>EXAM DATES</b>		
Test #1	September 22, 2010	Study hard	Bring two sharpened #2 pencils
Test #2	October 20, 2010	Study hard	Bring two sharpened #2 pencils
Test #3	November 17, 2010	Study hard	Bring two sharpened #2 pencils
Final	December 15, 2010, 1:00-3:00 PM	Study hard	Bring two sharpened #2 pencils

**Information sheet (please print legibly, thanks!):**

Name \_\_\_\_\_

Home town \_\_\_\_\_ High school attended \_\_\_\_\_

What year are you? (freshman, sophomore, etc.) \_\_\_\_\_ Major \_\_\_\_\_

e-mail address \_\_\_\_\_

(Please print this address very carefully, exactly as you would send a message to yourself.)

Other UNL activities you are involved in \_\_\_\_\_

Do you read any magazines? If so, what are they? \_\_\_\_\_

What are the last two books you read that were not required as part of a course? \_\_\_\_\_

What museum did you last visit, and when was that visit? \_\_\_\_\_

Have you taken at least six semesters of a foreign language, or do you speak and read a language other than English, and if so, what is it? \_\_\_\_\_

Foreign countries you have visited \_\_\_\_\_

Reason you are taking this course \_\_\_\_\_

Might you be at all interested, ever, in undergraduate research? \_\_\_\_\_

Do you have a scholarship? \_\_\_\_\_ If so, what kind? \_\_\_\_\_