

BIOL 1010 Introduction to Biology: The Evolution and Diversity of Life. Fall 2009

Department of Biology, College of Arts & Sciences, Valdosta State University

From the VSU Undergraduate Course Catalog: “*An introduction to the diversity of life on Earth with a special emphasis on ecological and evolutionary processes and relationships.*”

Section C Mon/Wed/Fri 11:00 – 11:50 AM Bailey Science Center, lecture hall 1011

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Office Hours: 2:00 – 3:00 PM Mon & Wed. Drop by anytime within that slot, or otherwise, if I’m in my office. I’m also very good at responding to e-mail – use it anytime and I’ll usually get back to you within the day.

Course Objectives: This course introduces non-Biology major, undergraduate students to the varied concepts of how life on Earth got to be what it is, and where it’s going. This includes a survey of what that life is, how it got to be here, the relationships among it, and what the impact and significance of those relations are. The entire course is solidly based on evolutionary science and will be taught from that perspective, including the three domain classification of all cellular life.

The course fulfills three of the eleven general education credit hours required in section D1 (Science, Mathematics, and Technology) of the VSU core curriculum as prescribed by the University System of Georgia. This course and the BIOL 1020 Biodiversity Lab are co-requisites that complement each other by covering parallel material, though not necessarily in the same order. Upon completion of this course “students will demonstrate the ability to analyze, to evaluate, and to make inferences from oral, written, and visual materials” (VSU General Educational Outcome #7). Furthermore, students should be able to “describe the evolutionary processes responsible for biological diversity, explain the phylogenetic relationships among the major taxa of life, and provide illustrative examples” (VSU Biology Dept. Educational Outcome #2), as well as understand this vocabulary, after taking the course. And students should complete the course with the ability to “interpret ecological data pertaining to the behavior of the individual organism in its natural environment; to the structure and function of populations, communities, and ecosystems; and to human impacts on these systems and the environment” (VSU Biology Dept. Educational Outcome #5).

Textbook: *Biology: Concepts & Investigations*, 2009, 1st Edition, by Mariëlle Hoefnagels

The textbook provides critical scientific content and is written from a strong evolutionary perspective. The readings listed in the Course Schedule within this syllabus must be completed before the lecture for the day on which they are listed. Periodic, very brief, unscheduled, in-class and/or out-of-class assignments will

evaluate your understanding of these readings and your participation in the course. Any information in the assigned textbook readings can be included on the examinations, whether or not it is an explicit part of my lectures. The text's accompanying Web site (<http://www.mhhe.com/hoefnagels>) can be very helpful and I recommend that you take advantage of the diverse collection of images, animations, practice quizzes, and tutorials among its material.

Attendance: Class attendance is mandatory. Roll may be taken at any point, but will also be ascertained through completion of the unscheduled short assignments. If you must miss a class, you are responsible for the missing material. It is quite unlikely that you will be able to perform well on the exams, if you miss too many classes. Also, show up to class on time; I will not wait for you. And, if you ever are forced to be late, enter through the rear doors without disturbing the class. Furthermore, the university mandates the following attendance policies, which I must enforce: (1) "A student who misses more than 20% of the scheduled classes of a course will be subject to receiving a failing grade in the course." (2) "Instructors may assign a 'W' on the proof roll for students not attending class. It is the responsibility of the student to complete the withdrawal process.... The instructor may assign a grade of 'W' or 'WF' after mid-term." (3) "Any student who discontinues class attendance after mid-term and does not officially withdraw may be assigned a grade of 'F'."

Assessment/Grading: There will be five multiple choice exams, four topical tests delivered throughout the semester during standard class time that cover the material within that section, and one comprehensive final given during the university-wide scheduled time period. Make-up exams will only be offered under the most dire of situations, will require you to notify me a minimum of 24 hours beforehand, and will be given entirely at my discretion. They will be much harder than the regular exams, probably being of an oral or written essay format, so I do not recommend going that route, unless it is absolutely necessary!

The remaining grading components come from those assignments mentioned above under the Textbook heading and from your attendance/participation record. These points can all be considered bonuses — everybody should get their full value by just doing the required short assignment work, which will be very easy, and by showing up and participating in the course for every session.

Your final grade is based on the standard scale. A: 100–90%, B: 89–80%, C:79–70%, D: 69-60%, F: 59–0%.

Breakdown:

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| Examinations | 4 Topical Exams (10% Each on Sections I-IV) | 40% |
| | Comprehensive Final Exam | 40% |
| Other Factors | Short Assignments (anytime, anywhere) | 10% |
| | Attendance/Participation | 10% |

Academic Honesty: Students are expected to maintain high standards of integrity. The VSU Academic Conduct Code (<http://www.valdosta.edu/judicial/AcademicStudentConductCode.shtml>) is a basic behavioral

standard, but everyone in the class is required to read the Biology Department Plagiarism Policy (<http://www.valdosta.edu/biology/documents/biologyplagiarism.doc>) as well. Never copy text or illustrations from a book or Website and represent it as your own — always cite your sources of information. Do not cheat in any manner! Using any type of aid on in-class assignments or exams, other than your own brain, is cheating. Dishonesty will not be tolerated, and any student misconduct will be reported to the Office of the Dean of Students. Evidence of cheating will result in no credit for the assignment or exam, and depending on the case, could result in a failing grade for the entire course.

Disruptive behavior: You are adults and are expected to behave as such. I expect everyone to be considerate of their fellow students. Any disruptive behavior that interferes with the teaching of the lecture or disturbs other students or faculty will not be tolerated. This includes cellular phone usage during class time and any other non-class related communication between students. You are also not allowed to bring food or drink into the lecture hall. Any student who disrupts the class will be removed from the class and possibly dropped from the course. Refer to the VSU Non-Academic Conduct Code for further information (<http://www.valdosta.edu/judicial/ConductViolations.shtml>).

Family Educational Rights & Privacy Act: By Federal law, grades cannot be posted by Name, Social Security Number, or other Personal Identifiers. Scores and student work will not be given over the telephone, by e-mail, or to another student. You must speak to me personally or wait for your official grades.

American Disabilities Act: Students requiring classroom accommodations or modifications because of a documented disability should discuss this need with the instructor at the beginning of the semester. These students must register with the Access Office (<http://www.valdosta.edu/access/>) located in Farber Hall, 229-245-2498 (V/VP) and 229-219-1348 (TTY), e-mail access@valdosta.edu.

Student Assistance: The Student Success Center is located in Langdale Residence Hall and is available to all students. The SCC provides free professional and academic advising, peer tutoring in core courses, and campus job information. Phone: 229-333-7570 or email: ssc@valdosta.edu.

Course Schedule (subject to change at the whim of the instructor):

| <u>Date</u> | <u>Topic</u> | <u>Reading Assignment</u> |
|-------------|--|---------------------------|
| M Aug 17 | Section I: The Evolutionary Framework The nature of science, and of life | in-class syllabus |
| W Aug 19 | What Evolution is, and what it isn't | Preface & Chapter 1 |
| F Aug 21 | Natural selection, and variation through mutation | Chapter 13 |
| M Aug 24 | Population genetics and the neutral theory | |
| W Aug 26 | Speciation and extinction | Chapter 14 |
| F Aug 28 | 'Tree of Life,' 'primitive,' 'progress' & 'contingency' | |

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| M Aug 31 | Seeing evolution — morphology | Chapter 15 |
| W Sept 2 | Seeing evolution — molecules | |
| F Sept 4 | Phylogenetics — how it all fits together | |
| M Sept 7 | <u>Labor Day Holiday!</u> | |
| W Sept 9 | Origins and deep time — hard to imagine | Chapter 16 |
| F Sept 11 | Human evolution — where we came from | |
| M Sept 14 | <u>Section I Exam</u> | |
| W Sept 16 | Section II: Archaea and Bacteria, a hidden and misunderstood world | |
| | More different, more prevalent, and more ancient | Chapter 18 |
| F Sept 18 | The major phyla of both domains | |
| M Sept 21 | Archaea — Carl Woese and it's discovery | |
| W Sept 23 | They're everywhere, including the most extreme places | |
| F Sept 25 | Bacteria — many good guys and bad guys | |
| M Sept 28 | Bacterial promiscuity — sexier than you thought | |
| W Sept 30 | Bacterial bad guys, disease, and antibiotic resistance | |
| F Oct 2 | Bacterial good guys — work for us and absolutely necessary | |
| M Oct 5 | <u>Section II Exam</u> | |
| W Oct 7 | Exam review and consultation | |
| Th Oct 8 | Fall Midterm: <u>Last day to withdraw</u> | |
| F Oct 9 | Section III: Eukaryotes | |
| | What we know (we thought) and see (we thought) | |
| M Oct 12 | Protista, not really a kingdom | Chapter 19 |
| W Oct 14 | Way more critters than you knew, and all sorts of 'em | |
| F Oct 16 | The plant world, life needs 'em | Chapter 20 |
| M Oct 19 | <u>Fall Break!</u> | |
| W Oct 21 | Spores versus seeds, and then fruit | |
| F Oct 23 | Fungi — more than just 'shrooms | Chapter 21 |
| M Oct 26 | Invertebrates — the creepy, crawlies of life | Chapter 22 |
| W Oct 28 | Vertebrates — 'spineless' ones, and fishes | Chapter 23 |
| F Oct 30 | Amphibians, then reptiles, including birds | |
| M Nov 2 | Mammals, including us! | |
| W Nov 4 | What about viruses? | Chapter 17 |
| F Nov 6 | <u>Section III Exam</u> | |
| M Nov 9 | Section IV: Ecology and Biodiversity | |
| | Why can't we all just get along? | Chapter 39 |
| W Nov 11 | How does population genetics relate? | |
| F Nov 13 | Symbiosis, mutualism, and parasitism | |

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| M Nov 16 | What is a community, an ecosystem? | Chapter 40 |
| W Nov 18 | Biomes — i.e. the niches of life | Chapter 41 |
| F Nov 20 | Gaia | |
| M Nov 23 | <u>Section IV Exam</u> | |
| W Nov 25 | <u>Thanksgiving Holiday!</u> | |
| F Nov 27 | <u>Thanksgiving Holiday!</u> | |
| M Nov 30 | Behavioral ecology | Chapter 38 |
| W Dec 2 | Human impact on the biosphere | Chapter 42 |
| F Dec 4 | Review and Exam preparation | |
| M Dec 7 | <u>No class</u> (unofficial Exam Prep day, since Tuesday/Thursday courses get one) | |
| W Dec 9 | <u>No class</u> (other course Final Exams) | |
| F Dec 11 | <u>Comprehensive Final Exam</u> from 12:30 to 2:30 PM | |

What to expect and how to excel: This course will require you to think, duh. It will not be about rote memorization, although the vocabulary of biology is an absolutely necessary component that will mandate some memorization. But remember, it is just English, and most words break down into roots that make sense. Sure, taxonomic nomenclature is based on descriptive Latin roots, but I am not going to make you memorize genera and species names. The big picture is what matters — how it all fits together. And, as the famous classical evolutionist Theodosius Dobzhansky stated back in 1973, “Nothing in biology makes sense except in the light of evolution.”* Evolution provides the single, unifying, cohesive force that allows all of life to be explained. It is to the life sciences what the long sought holy grail of the unified field theory is to astrophysics. Therefore, you will need to think about everything in this course in that light in order to be successful in the course!

As an instructor I can only facilitate your learning by offering good examples and by trying to explain phenomenon. It is your responsibility to truly understand and comprehend the concepts. You absolutely need to interact with me. If you do not understand things, discuss them with me — either in class, or if you are shy, in person in my office. Decide to start working hard right away. It is impossible to blow off the beginning of the course and still get a decent grade, because everything builds off the initial concepts taught at the start of the course. You will need to attend class and take decent notes. My lectures do not come directly from the textbook; they incorporate examples from my own and others’ actual research. It’s all fair game for exams. Plus, I give those short assignments periodically throughout the semester. If you miss them, you lose out on a very easy 10% of your total grade. I encourage you to become friendly with your fellow students and work together on the short out-of-class assignments, and within group exam study sessions. I do not consider that cheating. Above all else, try to have fun learning this stuff — biology is fun!

* The source of the original 1973 quote is a bit obscure though it has been cited as being transcribed from an article Dobzhansky wrote for the *American Biology Teacher*, 1973. 35, pp 125-129.