

---

# Biology 197: Principles of Organismal Biology

Section B: T, R 9:30–10:45 AM

Section D: T, R 1:30–2:45 PM

Spring 2011

Birck Hall 003

**Instructor:** Dr. Phil Novack-Gottshall

**Office:** Birck 332

**E-mail:** Blackboard mail preferred

**Office hours:** T 11–1:30, W 11–1, R 11–12:30

(or pnovack-gottshall@ben.edu)

or by appointment

---

## Course Description

Organismal biology is one of the major branches of biology and is concerned with all aspects of the life of organisms, including their biodiversity, anatomical structure, physiology, development, biogeography, and ecology. This course is an introductory course required for all biological sciences majors, but it is also useful for gaining basic biological literacy and for those pursuing careers in human and veterinary medicine, psychiatry, agriculture, forestry, microbiology, conservation, ecology, paleontology, environmental science, law, political science, and even cooking, cheese making, and brewing of alcohol. In this class, we will learn the major groups of animals, fungi, plants, protists, algae, and bacteria; their basic characteristics; and how biologists study these organisms to understand their rich evolutionary history, ecological interactions, amazing adaptations, and relevance to humans and other species. In particular, you will practice learning how to view the world and to think like an organismal biologist.

## Learning objectives

- 1) Explain the scientific method of organismal biologists to understand the natural world.
- 2) Identify the major lineages of life through study of their biodiversity, anatomy, physiology, development, behavior, biogeography, fossil record, and ecology.
- 3) Explain the significance of major transitions in organismal evolution: photosynthesis, endosymbiosis, sexual reproduction, multicellularity, skeletonization, cephalization, terrestrialization, mobility, and carnivory, among others.
- 4) Understand and practice the methods of organismal biologists, including observation, phylogenetics, experimentation, and form/function studies.
- 5) Understand overarching issues in evolutionary and ecological theory, including natural selection, adaptation, other evolutionary mechanisms, speciation, extinction, reproduction, competition, coevolution, and common descent.
- 6) Practice the skills of reading and writing scientific prose by researching a specific organism in the primary literature.

## Required course materials

- 1) Freeman, S. 2011. *Biological Science*. 4<sup>th</sup> ed. Pearson Benjamin Cummings, San Francisco.
- 2) *Principles of Organismal Biology (Sec. B & D) Course Packet*. Available at Bookstore.
- 3) Interwrite Personal Response System (clicker)

## Prerequisites:

This course has no prerequisites. It is one of two introductory lecture courses required for the Biology, Health Science, Environmental Science, and Biochemistry majors.

**IDEA Objectives:**

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories

**Illinois State Board of Education Core standards:**

Science: 1A, 1C, 1D, 1G, 3C, 3E, 3F, 4A–D, 4H, 4I, 7C, 7G, , 9A–C, 9E, 9F,

Biology: 2D, 3A–H, 4C–F, 4H, 5A, 5D, 5F, 6A–D

**Blackboard and technology requirement**

Although regular attendance is vital to success in this course, it's not sufficient. The Blackboard site will also have important information for you, such as case study handouts, learning evaluations, study guides, outside readings, reading quizzes, and important announcements. You will also have to use this site to post some assignments. You can get to the course site using <http://www.ben.edu/blackboard>. Once there, log-in and click on the course site. If you have problems logging in or locating the site, just follow the links.

**A note on my office hours**

The best science teachers also practice scientific research. Although I do research throughout the week, I reserve Mondays for uninterrupted research. I will not regularly be available to meet with you on this day except for exceptional circumstances. You are still welcome to e-mail me with questions and concerns during this time, and I will make every effort to respond in a timely manner. However, an e-mail response cannot be guaranteed until the next work day. On other days, you're welcome to call me on campus (630-829-6514), stop by my office or lab, or e-mail me (pnovack-gottshall@ben.edu). **I don't accept phone calls at my home.**

**Grading Policies**

Your grades will be assigned on a percentage scale, as follows:

≥90% = A; 80-89% = B; 70-79% = C; 60-69% = D; <60% = F

Exam #1 (Feb. 17)	15%
Exam #2 (Mar. 15)	15%
Exam #3 (Apr. 19)	15%
Cumulative Final Exam (May 14)	15%
Case studies and other assignments	15%
Reading quizzes (Top 5)	10%
Learning evaluations (Top 5)	5%
Campus activity reports	5%
Attendance	5%

### *Exams (and policy on attendance on test dates)*

There will have four exams, including a cumulative final exam. Attendance is required on all test dates. Make-ups will only be allowed for exceptional circumstances. The professor will make the determination of whether or not the documentation justifies a make-up exam. In those rare cases where a make-up is allowed, the exam will be scheduled for final exam week. Make-up exams will be essay-based and substantially more demanding than regular exams. Do not leave campus until your scheduled final exams are over. If you have a trip requiring you to leave before your scheduled exam, you will receive a zero on the exam or have to reschedule your trip.

The format of exams may include multiple choice, matching, fill-in-the-blank, short answer, and essay questions. Exams will have you apply concepts learned in class instead of asking you simply to repeat facts and definitions (although you will still be expected to use relevant terms correctly). Memorization, last minute studying, and over-dependence on lecture notes are not useful strategies. Reading the textbook throughout the semester and reviewing your notes daily will help support and enrich your knowledge.

The final exam is cumulative, although it will emphasize material since the second exam. Although longer than previous exams, it will have the same general format. It will occur on **Saturday, May 14, 1:00-3:00PM** in a room to be announced.

### *Case studies, clicker and take-home assignments*

In order to help you “think like an organismal biologist,” you will be exposed to various case studies during lecture and assignments that (i) focus on a particular organism and/or concept and involve deepening your experience and understanding of particular organisms, (ii) apply theoretical concepts from lecture, (iii) introduce a variety of ways that scientists study organisms, and (iv) focus on scientific inquiry as a means to test hypotheses. Case studies may cover a single lecture or span multiple ones; case study assignments will be due the next class after each case study is finished in class. In addition, these will be written and Interwrite Personal Response System (clicker) assignments throughout the semester. **Your lowest assignment score will be dropped.** Because these case studies and assignments form an integral portion of our classroom experience (and are worth 15% of your grade), it is critical that you come to class and participate in them.

### *Reading quizzes*

Reading comprehension is one of the most important academic skills. (And it is a great predictor of one's MCAT, GRE, and SAT scores.) We will have regular outside readings to enrich your understanding of class topics. To improve your abilities, there will be six **on-line (Blackboard) quizzes** on these readings during the semester. If you have reasonable reading comprehension and have read the readings beforehand, each quiz should take no more than 10 minutes. **However, the quizzes will be open note, and you will have one hour to complete each.** Once you start a session, you will only have one opportunity to finish it; make sure to set enough time to finish it! There will be 6 quizzes, but **your quiz grade will be based on your five best scores.** Under no circumstances will you be able to take any quiz once the session time has ended

### *Learning evaluations*

To have the best course learning experience, there will be regular opportunities to gauge both your learning and my teaching. An example of a learning evaluation might be to reflect on your lifetime goals and to see how (or if) your current college experience is useful for these goals. An example of the latter might be to offer suggestions on what is most successful about class and what is least successful. In this way, we are both mutual learners. For each of these assignments, I will give you an evaluation of 3 (√+), 2(√), 1(√-), or 0 based on your thoughtful participation. **Although there will be several learning evaluations during the semester, your grade will be based only on your five best evaluations. However, you must take the first two, which cannot be dropped.**

### *Campus activity reports*

One of the goals of a liberal arts education is to continue learning outside the classroom and to be exposed to new and diverse interests. Therefore, during the term, you must **attend and report on at least five academic, cultural, or extracurricular events** at which you learn or experience something new. These events can be any formal campus or off-campus event, service or volunteer activity, university sporting event, or cultural event. Some suggestions include:

- Academic seminars, guest lectures, departmental open houses, residence life or library information meetings, or study skills workshops held on campus.
- Student group events, artistic performances, foreign or documentary film screenings, art or museum exhibitions, or athletic, religious, or cultural events held on or off campus.
- Service or volunteer activities, such as soup-kitchens, environmental clean-up days, or election monitoring.
- Purely social or family events (parties, dances, movie outings, dinners, game nights, baby sitting, etc.) **cannot** count unless they take you outside your "comfort zone" and offer new experiences. (Experiencing a new cuisine, culture, or perspective is fine, such as attending Chicago's Taste of Greece or SummerDance events or eating at a sushi restaurant for the first time.)

**At least three events must be official Benedictine University events** and you can only attend **up to two events in the same category**. (For example; you cannot use three athletic performances or three art museum exhibitions.) You can include up to two activities you perform or participate in. To receive credit, you will write a paragraph or two describing the event (including what, when, and where it occurred) and what you learned, and submit it to Blackboard **within one week of attending the event**. Save proof of attendance (tickets, programs, etc.), which your professor may request to substantiate your attendance. If you are not sure whether an event is suitable to fill this requirement, just ask. All activity reports are due by the due date specified on the Blackboard assignment dropbox. Late reports will be penalized 10%. You can replace earlier report scores (with a late penalty, if applicable) after you've completed all five reports. See the fifth campus activity report dropbox for details.

### *Attendance*

I will take attendance most days throughout the semester (normally using the course clicker); and you will have to be present to get credit for the clicker and case study assignments. **You must have a clicker to get attendance credit.** You can miss up to two classes for any reason without penalty. **More than two absences will result in a reduced attendance score.**

### *Lateness*

Lateness should be avoided. To compel you to hand in assignments on time, there is a lateness policy. **All written assignments (including case studies) will be deducted 10% per class. Learning evaluations will be deducted 1 point per class. Jurica-Suchy Museum assignments will be deducted 10% per 24-hour period (excluding weekends).**

### *Withdrawing from class*

The last day to withdrawal from class is **Sunday, April 17. If you are considering withdrawing, please come speak with me first.** I want to help you do the best you can in this class. You may be doing better than you fear!

### *A promise*

I want you to do well in this course, and I know you can. To encourage you to come to class and to do participate in class, I will add **2% to your final course grade** if you do **every** exam, learning evaluation, case study, reading quiz, at least five campus activities, and any other assignments **on time**, and have satisfactory attendance and participation. This bonus applies regardless of how well you performed on these various class activities.

---

### **Academic honesty policy**

The university faculty and student representatives have agreed to the following uniform statement of academic honesty. The search for truth and the dissemination of knowledge are the central missions of a university. Benedictine University pursues these missions in an environment guided by our Roman Catholic tradition and our Benedictine heritage. Integrity and honesty are therefore expected of all members of the university community including students, faculty members, administration and staff. Actions such as cheating, plagiarism, collusion, fabrication, forgery, falsification, destruction, multiple submission, solicitation, and misrepresentation are violations of these expectations and constitute unacceptable behavior in the university community. The penalties for such actions can range from a private verbal warning, all the way to expulsion from the university. The university's Academic Honesty policy is available at <http://www.ben.edu/AHP> and students are expected to read it.

Giving information to another student about the contents of a test or receiving such information is considered cheating, regardless of whether the action was intentional or consequential. Using cheat notes on a test is cheating. Copying from or looking at another

student's test or allowing someone to see or copy from your test is also cheating. In-class cheating is a very serious offense. **In the Biology department, the first infraction on an assignment/paper/quiz will result in a zero for that task. The second infraction will result in an F in the course. Dishonesty on tests/ exams or specified assignments will result in an F for the course.** According to university policy, the Provost will be notified of all incidents of cheating and you will be subject to the penalties imposed by that office which may include expulsion from the university. (See Student Handbook for details on academic honesty policies.)

### **Cell phones, calculators, and laptops**

Please turn off your cell phones, iPods, Blackberries, and other electronic devices before coming to class. Use of calculators will NOT be allowed during tests. Laptops can only be used during lecture to take notes; you cannot catch up on Facebook, e-mail, or surf the internet during class.

### **Policy on academic accommodations for religious obligations**

A student whose religious obligation conflicts with a course requirement may request an academic accommodation from the instructor. Students must make such requests in writing by the end of the first week of the class. Upon receiving such a request, the instructor will offer reasonable accommodations whenever feasible, and communicate this to the student. However, the course requirements listed in the syllabus remain in effect if accommodations cannot be offered.

### **Disability support**

If you have a documented learning, psychological, or physical disability, you may be eligible for reasonable academic accommodations or services. To request accommodations or services contact the Student Success Center, Room Krasa 012A (630-829-6512). All students are expected to fulfill essential course requirements. The university will not waive any essential skill or requirement for a course or degree program.

### **What if I miss a class?**

It is your responsibility to come to class regularly and to take notes. If you miss a class, you should contact at least two other classmates to learn what happened in class on the day you were absent, to get updated on announcements, and to photocopy any materials distributed that day. Do not ask your professor what you missed; it is not his responsibility to catch you up!

### **What if I come late to a class?**

Students who arrive to class late not only miss important information, but also disrupt other students' learning. You are expected to come to class on time and ready to begin work.

**Will extra credit be available?**

Not usually, and only when made available to the entire class. Most exams will have an extra-credit question. Your grade will be based solely on your performance on the items in the Grading Policy and on this syllabus. Make the most of every opportunity throughout the semester.

**Twelve ways to do well in this course:**

- 1) Attend class regularly.
- 2) Visit the Blackboard site regularly.
- 3) Come to class curious about life on earth and prepared to learn.
- 4) Come to class early and open your notes before class starts.
- 5) Look over your notes from the previous class before class starts.
- 6) Introduce yourself to me. I ask questions to those I don't yet know!
- 7) Ask questions! Ask during class, ask during office hours, ask whenever.
- 8) Be courteous and respectful. Turn off your cell phone and iPod, do not chat, and do not walk around class. Your peers and I will be offended, and you may be asked to leave.
- 9) Look over your notes sometime after each class ends.
- 10) Read your textbook, and use it to make sense of those areas you didn't quite understand from lecture. A different perspective always helps.
- 11) Have a good night's sleep.
- 12) Attend class regularly.

**A final caveat**

Your professor is not capricious, but he does reserve the right to alter this syllabus, class policies, or the class schedule to best accommodate the needs of the class. If such a change is needed, you will be given sufficient and timely notice, as well as the ability to contest or contribute to the alterations thereof.

<b>Schedule</b>		
<i>Date</i>	<i>Topic</i>	<i>Readings*</i>
Jan. 18	The science of life, & the life of scientists	Ch. 1
Jan. 20	How organisms are structured	Pp. 601-617, 806-811, 993-995
Jan. 25	What are species, & how do we study them?	Pp. 7-8, 458-462
Jan. 27	Resolving the tree of life	Pp. 5-7 & ch. 27
Feb. 1	Phylogenetics and cladistics	P. 460-461 & Ch. 27 (pp. 474-479)
Feb. 3	Primate tree of life	Pp. 668-673
Feb. 8	Evolution & natural selection	Ch. 24 & pp. 494-495
Feb. 10	<b>NO CLASS</b>	
Feb. 15	Other mechanisms of evolution	Ch. 25 (pp. 443-455) & pp. 462-465
Feb. 17	<b>EXAM 1</b>	
Feb. 22	Bacterial reproduction, metabolism, & biodiversity	Ch. 28
Feb. 24	"Protists," algae & other overlooked wonders	Ch. 29
Mar. 1	Endosymbiosis & the origin of eukaryotes	Pp. 526-532
Mar. 3	Algal transition to plants	Ch. 29
Mar. 8	Terrestrialization of plants: How plants feed, breathe & stand tall	Ch. 30 and peruse Ch. 36
Mar. 10	How plants reproduce & move	Ch. 30 and peruse ch. 40
Mar. 15	<b>EXAM 2</b>	
Mar. 17	Biodiversity of early land plants	Ch. 30 continued
Mar. 22	<b>SPRING BREAK (NO CLASS)</b>	
Mar. 24	<b>SPRING BREAK (NO CLASS)</b>	
Mar. 29	Biodiversity of vascular plants: Standing tall	Ch. 30 continued
Mar. 31	Biodiversity of flowering plants	Ch. 30 continued
Apr. 5	Fungal biodiversity & reproduction	Ch. 31
Apr. 7	Lichen, smut, alcohol, & other depravities	Pp. 580-582, 586-590
Apr. 12	Basal animals: Coloniality & multicellularity	Pp. 617-620
Apr. 14	Being bilaterian	Pp. 479-488, 603-609, 623-627
Apr. 19	<b>EXAM 3</b>	
Apr. 21	The fossil record of the Cambrian radiation	Pp. 479-488, 603-609, 623-627
Apr. 26	Origin of skeletons	Pp. 479-488, 603-609, 623-627
Apr. 28	Arthropods: Life in a suit of armor	Ch. 33 (esp. pp. 637-644) & pp. 476, 381-385
May 3	Molluscs: Life in a shell	Ch. 33 (esp. pp. 631-636)
May 5	Being bony: Emergence of the vertebrates	Pp. 417-418 & Ch. 34
	Ecology: Reproduction, populations, & interactions	Pp. 993-995 & Ch. 52
	Communities, ecosystems, & conservation biology	Pp. 993-995 & peruse Ch. 53-55

*\* Additional readings to be assigned on Blackboard*