

# Great Experiments in Biology (BIO-100G.001-008)

## Spring Semester 2009

**Who is he?:** Dr Chris Tudge, Department of Biology, American University

**Where do I find him?:** Hurst Hall 6 (basement of the Biology Building)

Office Hours – Monday 12-2 pm & Tuesday & Friday 9-11 am. No appointment needed.

**How do I contact him?:** Phone - (202) 885-2033 or e-mail [ctudge@american.edu](mailto:ctudge@american.edu)

**Where is class?:** Ward 2, Mon. & Thurs. 9:55 –11:10 am

**Where is lab?:** Hurst Hall 106

### Text:

1. Cain, Damman, Lue, and Yoon (2007) *Discover Biology*, 3<sup>rd</sup> edition, W. W. Norton & Company, ISBN10: 0-393-92868-3.

Website: <http://www.wwnorton.com/college/biology/discoverbio3/core/index.asp>

2. Zeller, N. 2009. BIO-100 Great Experiments in Biology: Lab Manual (available on-line at <http://www.universityreaders.com/students>).

**Course Description:** (Credits = 4) Great Experiments in Biology is a foundation course in Curricular Area 5: the Natural Sciences in the university's General Education program. Completion of this foundation course will serve as a prerequisite for a second level course in Area 5 (see end of syllabus for list). General Education courses within the foundation level of Curricular Area 5 are designed to introduce students to the basic concepts used in the Natural Sciences. In the Great Experiments lectures, we will discuss many of the fundamental principles and topics used routinely by biologists, such as the scientific method, the structural components of cells and how they work, genetics, evolution, ecology, and conservation biology. Within the laboratory, you will perform hands-on experiments that are closely related to the lecture material. At the end of the semester, you will have some appreciation for biology and the biological sciences and have a good basis for understanding scientific findings presented in the media.

**Lecture Attendance:** It is important to attend all lectures. Students are responsible for all materials covered in lecture and those assigned by the instructor. At times, material may appear in class that is not covered in the book and may appear on exams. Worksheets will be handed out on days that we will be watching a movie. You are to complete the worksheet and turn it in before leaving that class.

**Laboratories:** Attendance in the laboratory is mandatory. In the laboratory, arriving late may result in your missing a quiz. So be on time! **Note that if you miss 3 laboratories, you will automatically fail the entire course.** If you cannot avoid missing a laboratory period, please see your lab Teaching Assistant (TA) well in advance of the scheduled lab period. You will not get credit for a lab report if you do not attend the lab. For each lab, there may be a quiz at the beginning of the lab period that will cover the assigned readings for that day. Lab reports are due within the first 10 minutes of class at the beginning of the next lab period and are to be handed into the TA when you arrive in lab. Lab reports must be word-processed or typed. Additional information on regulations and assignments will be provided during the first week of the lab.

Labs are conducted by teaching assistants (TAs) and overseen by Dr. Zeller. For issues relating to lab, first ask your TA and if your TA is unable to resolve the issue then contact Dr. Zeller ([nzeller@american.edu](mailto:nzeller@american.edu), x2191, Hurst 106B).

### **Course Web Pages / Blackboard / Email**

There are two Blackboard websites for this course: one for the lecture and a second for your individual lab section. Please check both sites on a regular basis. The lecture site will contain powerpoint files of the lecture slides on the day of the lecture. The **COURSE INFORMATION** area contains the course syllabus. The **COURSE DOCUMENTS** area contains the powerpoint lecture notes. **Note: these notes are an outline of what is discussed in class. Please don't substitute it for coming to class. Students that do this typically don't perform well on exams in this class.**

To access information from Blackboard go to [www.american.edu/blackboard](http://www.american.edu/blackboard) and type in your user name and password. If you use an external email (hotmail, yahoo, etc) remember to forward your AU email to this server so that you won't miss any announcements that I send out to the class. Some email accounts (such as gmail) may require SPAM filters to be removed before they accept email that is forwarded from American University. You can forward email via [my.american.edu](http://my.american.edu) portal (click on the **Technology** link on the left side of the webpage and look for **Forward My AU E-mail** link).

**Exam Format:** Grades will be based on the following three components:

- i) **Lecture (total 60% of final grade)**

Exams (12% each) x 4	48% total
Worksheets (3% each) x 4	12% total
  
- ii) **Laboratory (total 40% of final grade)**

Your final grade is based on a combination of your lecture and your laboratory grade. The lecture grade is based on four exams and a worksheet component. Each exam will test you on approximately one-quarter of the material discussed during the semester. The format for exams will be multiple-choice. There is no cumulative final exam.

The grading scale to be used is:

A	= 93% and above
A-	= 92-90%
B+	= 89-87%
B	= 86-83%
B-	= 82-80%
C+	= 79-77%
C	= 76-70%
D	= 69-60%
F	= 59% and below

**Note: If you take this class pass/fail, you need to earn a C average to pass the class. If you take the class A-F, you need to earn a D to get credit for the course.**

**Course Policies:** Requests for re-grading must be in writing and handed in no later than one week after graded exams are returned. Make-up exams must be taken within one week of the missed exam and will be given strictly according to University rules (i.e. only because of absence due to illness, religious observance, or participation in University activities). A written statement from a physician, clergy, or University official is required. **Note: A "desk note" from the AU health center is not considered adequate documentation.**

**Departmental Policies: Departmental policies for Great Experiments class**

This class adheres to the following departmental policies.

1. There are no extra credit assignments.
2. Assignments, due in either lab or in lecture, will not be accepted late.
3. All assignments must be turned in as a hardcopy. Electronic assignments will not be accepted.
4. Laboratory attendance is mandatory. If you miss more than 3 lab classes, you will automatically receive a failing grade for the course.

**Academic Support:** If you experience difficulty in this course for any reason, please don't hesitate to consult with me. In addition to resources in department, a wide range of university-wide services is available to support you in your efforts to meet the course requirements.

*Academic Support Center* (x3360, MGC 243) offers study skills workshops, individual instruction, tutor referrals, and services for students with learning disabilities.

Writing support is available in the ASC Writing Lab or the *Writing Center* (x2991, Battelle 228).

*Counseling Center* (x3500, MGC 214) offers counseling and consultations regarding personal concerns, self-help information, and connections to off-campus mental health resources.

*Disability Support Services* (x3315, MGC 206) offers technical and practical support and assistance with accommodations for students with physical or psychological disabilities.

If you have a disability and might require accommodations in this course, please notify me with a letter from DSS or ASC early in the semester so that we can make arrangements to address your needs.

**Academic Integrity Policy:** Cheating, in any form, will not be tolerated. Allegations of cheating will be referred to the Dean of the College of Arts and Sciences and may result in a course grade of F, expulsion or other disciplinary action according to the rules outlined in the AU Academic Regulations at <http://www.american.edu/american/registrar/aic.htm>.

**Course Objectives:** Courses satisfying the General Education requirements in Curricular Area V (Natural Sciences) will help students to:

1. Understand how science works through explicit examination of scientific concepts, methods, and the underlying principles that govern scientific practice.
2. Examine the scientific paradigms that shape scientific inquiry, with attention to their historical development and change.
3. Experience hands-on scientific experimentation, through laboratory exercises.
4. Practice problem-solving using quantitative methods, statistical analyses, and computer data manipulations where appropriate.
5. See relationships between scientific thinking and similar analytical models in other fields.

6. Understand how the sciences replicate, control variables, explain error, and build explanatory models through successive experimentation.
7. Analyze and evaluate the “classic texts” of science, which would include, among others, a familiarity with the significance of such thinkers as Copernicus, Galileo, Darwin, Marie Curie, and Einstein.
8. Develop a respect for the finite resources of our planet, responsible use of technology, the limits of humane research, and the fragile wonders of the natural world.

**BIO-100G leads to the following 2nd level Gen. Ed. Curriculum Area 5 courses.**

ANTH-250G Human origins

BIO-200G Structure and function of the human body

BIO-210G General Biology II

BIO-220G The case for evolution

BIO-240G Oceanography

BIO-250G Living in the environment

CHEM-200G Human biochemistry and health

CHEM-220G Environmental resources and energy

HFIT-205G Current concepts in nutrition

PSYG-240G Drugs and behavior.

**Lecture Syllabus - Great Experiments in Biology (BIO-100G.001-008)**  
**Spring 2009**

Minor changes or slippage of material to later classes may be unavoidable but exam dates will not move.

- Lecture 1. Mon. Jan. 12: Course overview + The Nature of Science (Chapter 1)
- Lecture 2. Thur. Jan. 15: Chemical Building Blocks (Chapter 4)
- Lecture 3. Mon. Jan. 19: **No Class = Martin Luther King jr. Day**
- Lecture 4. Thur. Jan. 22: Cell structure & compartments (Chapter 5)
- Lecture 5. Mon. Jan. 26: Cell membranes (Chapter 6)
- Lecture 6. Thur. Jan. 29: Photosynthesis & Respiration (Chapter 8)
- Lecture 7. Mon. Feb. 2: Cell Division & Cancer (Chapter 9 & Interlude B)
- Lecture 8. Thur. Feb. 5: **Exam 1 (Chapters 1,4,5,6,8)**
- Lecture 9. Mon. Feb. 9: Patterns of Inheritance (Chapter 10)
- Lecture 10. Thur. Feb. 12: Chromosomes and human genetics (Chapter 11)
- Lecture 11. Mon. Feb. 16: **Reproduction video and worksheet**
- Lecture 12. Thur. Feb. 19: DNA (Chapter 12)
- Lecture 13. Mon. Feb. 23: Gene to Protein (Chapter 13)
- Lecture 14. Thur. Feb. 26: DNA technology (Chapter 15)
- Lecture 15. Mon. Mar. 2: Organizing Life (Chapters 2 & 3)
- Lecture 16. Thur. Mar. 5: **Exam 2 (Chapters 9, Interlude B, 10-13, 15)**
- Lecture 17. Mon. Mar. 9: **No Class = Spring Break**
- Lecture 18. Thur. Mar. 12: **No Class = Spring Break**
- Lecture 19. Mon. Mar. 16: How Evolution Works (Chapter 16)
- Lecture 20. Thur. Mar. 19: Evolution of Populations (Chapter 17)
- Lecture 21. Mon. Mar. 23: Adaptations and Speciation (Chapter 18 & Interlude D)
- Lecture 22. Thur. Mar. 26: **Evolution video and worksheet**
- Lecture 23. Mon. Mar. 30: Biosphere (Chapter 20)
- Lecture 24. Thur. Apr. 2: Growth of Populations (Chapter 21)
- Lecture 25. Mon. Apr. 6: **Exam 3 (Chapters 2, 3, 16-18, Interlude D, 20)**
- Lecture 26. Thur. Apr. 9: Interactions among Organisms (Chapter 22)
- Lecture 27. Mon. Apr. 13: Communities of Organisms (Chapter 23)
- Lecture 28. Thurs. Apr. 16: **Population Paradox video and worksheet**
- Lecture 29. Mon. Apr. 20: Ecosystems (Chapter 24)
- Lecture 30. Thur. Apr. 23: Global Change (Chapter 25 & Interlude E)
- Lecture 31. Mon. Apr. 27: **Global Warming video and worksheet**

**Final Exam 4 (Chapters 21-25, Interlude E) April 30, 2009 @ 8:30 am**

