

OBJECTIVES

The modern biological vision sweeps from microseconds to millions of years and from micrometers to the biosphere. But it is merely ordinary vision expanded by the electron microscope, earth-scan satellite, and other prosthetic devices of science and technology. The precise discipline is defined by the point of entry. Organismic biology explores the way we walk and speak; cell biology, the assembly and structure of our tissues; molecular biology, the ultimate chemical machinery; and evolutionary biology, the genetic history of our whole species. The modes of study depend upon the levels of organization chosen, which ascend in a hierarchical fashion: molecules compose cells, cells tissue, tissues organisms, organisms populations, and populations ecosystems. To understand any given species and its evolution requires a knowledge of each of the levels of organization sufficient for the one directly above it.

Quotation from *Biophilia* by E. O. Wilson

Our society is immersed in a scientific revolution, largely biological in nature, that affects many policy issues of national and international importance as well as a wide range of personal activities. Over the last half century, we have witnessed unprecedented breakthroughs in genetics, cellular biology, and neuroscience as well as significant advances in understanding the environment around us. You cannot scan a newspaper or magazine without reading about new developments tied directly to the biological sciences. Indeed, the March 10, 1997, issue of *Business Week* highlighted the revolution in biological sciences and stated that "biology will define scientific progress in the 21st century." Early indications are certainly consistent with that prediction. Consequently, public understanding of the biological sciences and biotechnology is critical to responsible decision-making in our society, both public and private. Achievement of that understanding takes on a sense of urgency in the face of widespread scientific illiteracy. It is of great value to understand how science is done, to be able to judge the reliability of scientific knowledge, and to ensure the ethical use of this knowledge.

Biological Science [BSC 103] is an introductory course whose lectures are designed to acquaint you with basic concepts of biology and with the scientific approach to biological questions. The excerpt of Wilson's *Biophilia* attests to the complexity of modern biology, an immensely broad science that spans an ascending hierarchy of levels from molecules through cells and organisms to populations and societies -- from DNA to a herd of wildebeest. Nonetheless, biology is nearing its destiny as a unified science, and it will be presented that way to the you.

In an effort to see the "forest through the trees", the lectures will be organized to reflect the hierarchical nature of our study of life. Our focus or frame of reference will change as we move from one level of organization to the next beginning with the organism and ending by focusing "down" onto the molecular level. Throughout our treatment of the Biological Sciences, however, an evolutionary perspective will provide a common conceptual thread linking together all areas of biology regardless of focus. Theodosius Dobzhansky, a well known American biologist, put it succinctly in 1973: "Nothing in biology makes sense except in the light of evolution."

LEARNING OBJECTIVES: LECTURE

BSC 103 is part of the General Education Curriculum (GEC) of the University. As a consequence, the course fulfills the following GEC Student Learning Outcomes:

- * Students will demonstrate the ability to develop and focus on one topic in speaking and writing assignments and present ideas in an organized, logical, and coherent form.
- * Students will demonstrate the ability to use Standard English grammar, punctuation, spelling, and usage.
- * Students will have a good understanding of the scientific method.
- * Students will have good knowledge of the basic concepts of biological sciences.
- * Student will have a good understanding of the current areas of concerns or emphasis within at least one science discipline.
- * Students will be able to interpret scientific data and reach a plausible conclusion.
- * Students will have a good understanding of the techniques used in science.

LOGISTICS

1. Instructor: Frank R. Moore

2. Lecture: WSB 137 [Reuben Hall], M W 2:00 – 3:15 PM

3. Attendance: I am convinced that it is in your best interest to attend lecture, but that is your decision. When you do attend lecture, please be prompt. It is disruptive, not to mention ill-mannered, to interrupt lecture by arriving late or leaving early. Please turn off cell phones et al during class.

4. Drop Policy: Please be advised that I will not approve permission to drop this course after the designated 'last day to drop' unless extenuating circumstances justify my doing so. A failing grade or a decision that the course is too difficult does not represent extenuating circumstances.

5. Disability Accommodation: If a student has a disability that qualifies under the American with Disabilities Act and requests accommodations, he/she should contact the Office for Disabilities Accommodation (ODA) for information on appropriate policies and procedures. Disabilities covered by ADA may include learning, psychiatric, physical disabilities, or chronic health disorders. Students can contact ODA if they are not certain whether a medical condition/disability qualifies. Mailing addresses: 118 College Drive # 8568, Hattiesburg, MS 39406-8568. Telephone: 601.266.5024; TTY: 601.266.6837; FAX: 601.266.6035.

6. Evaluation: Your performance in this course (lecture only) will be evaluated on the basis of two criteria:

Exams (60%): Three "hour" exams will be given during the semester, and the last is scheduled during the Final Examination period. The three exams will be equal in value and objective in design.

Quizzes (20%): Several short/brief quizzes will be given during the semester.

Project (20 %): Each student will prepare a collection of print media (e.g., magazine, newspaper) articles (N = 25) related to the Biological Sciences. Your collection of articles will represent the range of scientific activity in the Biological Sciences (see syllabus and your textbook) and should be organized accordingly. This project satisfies the General Education Core writing requirement. See attached sheet for more details.

7. **Grades:** The grade of "A" will be achieved by students who earn 100 - 90% of the total points possible on exams plus project. The grade of "B" will be achieved by students who earn 89 - 80% of the total number of points, the grade of "C" by students who earn 79 - 65%, the grade of "D" by students who earn 64 - 50%, and the grade of "F" by anyone earning less than 50%. Makeup exams, which will be given during Final Exam period, are contingent on a disabling condition or situation [independent, written corroboration necessary].

8. **Studying:** I am confident that you can do well in this course. Take accurate notes in class and **find time soon after lecture to make sure that you understand your notes.** Be advised that your lecture notes will be your most important study aid because **test questions derive largely from lecture material.** Note further that lecture is not a condensation of textbook narrative; often the subject matter of a lecture is not covered in the textbook. Nevertheless, take advantage of the textbook; let it enhance your understanding of the material covered in lecture. I suggest that you read the material assigned in the text before you come to lecture, that way you can anticipate information about subject matter not well understood.

Lectures will be delivered within a PowerPoint format, and the PowerPoint presentations will be available online:

9. **Office Hours:** I will be available (a) Monday and Wednesday after lecture between 3:15 – 4:00 PM and (b) by appointment. Please call 266-4748 and ask to make an appointment. My office and laboratory are located in the Johnson Science Tower (JST 720 and 810, respectively). Please do not hesitate to ask me for whatever help or guidance you believe you need.

10. **Textbook:** *Life on Earth*, 4th edition. Audesirk, Audesirk, and Byers.

SYLLABUS

DATE	LECTURE TOPIC	TEXT CHAPTER(S)
JAN 14	LOGISTICS	
JAN 16	I. SCIENCE AS A WAY OF KNOWING	1
	Two Cultures	
	Epistemology	
	Biological Systems: Complexity & Hierarchical Structure	
JAN 21	MARTIN LUTHER KING DAY	

II. EVOLUTION: THE UNIFYING THEME

JAN 28	Evolutionary Mechanisms	13
FEB 04	MARDI GRAS HOLIDAY	
FEB 06	The Origin of Species & Extinction	14
FEB 11	History of Life and Organic Diversity	15, 16
FEB 20	“Creation Science” and Evolution	
FEB 25	FIRST HOUR EXAMINATION	
FEB 27	Last Day to Drop Classes without Academic Penalty	

III. THE ECOLOGICAL THEATRE

MAR 03	Population Biology	27
MAR 05	Community Ecology	28
MAR 10-14	SPRING BREAK	
MAR 17	Ecosystem Dynamics	29, 30

IV. ORGANISMAL BIOLOGY

MAR 24	Structure & Function: Animal & Plant	17 – 25
APR 07	Animal Behavior	26
APR 09	SECOND HOUR EXAMINATION	

V. MOLECULAR BIOLOGY

APR 14	Cells: Internal Organization	2 - 7
APR 21	DNA and Genetic Information	8 - 11
APR 28	PROJECT DUE	
APR 28	Biotechnology	12
MAY 07	THIRD HOUR EXAMINATION	

