

General Education Course Proposal

Proposed Course: BIOL 10 LIFE SCIENCE Units 3
Prefix No. Title

Department: Biology School: Natural Sciences

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3___; B4___
Breadth: B1___; B2 X; C1___; C2___; D___; E___
Integration: B___; C___; D___; International/Multicultural___

Existing Course X; Revised Course ___; New Course ___

Course Included in Current GE Program X

New courses require the Undergraduate Course Proposal form in addition to this form.

Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Biol 10. Life Science (3)

Not open to students with credit in BioSc 1A. How living things work and why they work that way. Biology from chemical and physical foundations through ecological and evolutionary processes. Biology and its relationship to human affairs. General Education Breadth Area B2. (2 lecture, 2 lab hours)

Enrollment limit per section: 240

Expected number of sections per semester – Year 1 2-4; Year 3 2-4

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

Thomas C. Melby 3/6/98 Quamran 3/13/98
Department Chair Date School Curriculum Committee Date
William Way 3/13/98 Peter Ann 10/29/99
School Dean Date General Education Subcommittee Date
Brandt Kehoe 10/29/99
Associate Provost Date

1/14/98

OCT 8 1999

Memorandum

To: Brandt Kehoe Interim Associate Provost
From: Tom Mallory, Chair *Thomas C. Mallory*
Department of Biology
Date: September 15, 1999
Re: Changes to GE Proposal - Biology 10: The Writing Requirement

An addendum to Attachment 2.

The two thousand word lower division writing required in Biology 10 is satisfied by an aggregate of laboratory reports and a three page term paper on a contemporary topic in biology. Both of these assignments are described in the attachment from the lab syllabus. Due dates are scheduled in the lab syllabus. Failure to satisfy either requirement is sufficient to require that the student repeat the course. The aggregate probably exceeds five thousand words.

1. Ten laboratory reports are submitted for credit. These consist of short answers to questions posed in the lab manual and entire paragraphs composed to explain lab results, predict outcomes, and extend observations into new areas altogether. These are graded and returned by lab instructors each week. Three missing assignments will cost the student a letter grade. If a fifth is missed the student is required to repeat the class.
2. The term paper assignment is described in the attached pages from the lab manual itself. Note that the assignment as presented to the student encourages the student to take responsibility for learning, to engage in critical and independent thinking, and exposes students to the most modern methodologies of the discipline. This is sustained multiparagraph assignment, both expository and critical, on a topic of relevance to the individual student. The paper is graded by an instructor and returned to the student. The paper accounts for one eighth of the lab grade and must be submitted for the student to get GE course credit.

Attachments: Biology 10 GE application for Area B2

1. Ways Biology 10 meets the specifications of the General Education Policy and the Policies for Inclusion and Evaluation of General Education Courses.

A course syllabus is attached as are copies of a few overheads and handouts. These should provide some idea of the complexion of the course. Each portion of Biology 10 reflects all aspects of GE goals and objectives.

Biology 10 begins with the distinction between science and other forms of knowledge, objective and subjective evidence, and other aspects of critical thinking. It conveys biology from the beginning as a human endeavor that people engage in to understand life. It isn't a list of facts.

We proceed with an attempt to define life but recognize quickly that life may not be something that "is" (an "élan vital" as history would have it) and opt eventually for listing the characteristics of living things and the sorts of processes that occur in them. This helps establish early the limits of scientific endeavors. There are philosophic and pragmatic reasons for seeking answers to question like this - many of us will ask "when is life over?" for example, as we plan and manage health care for ourselves and our family.

The fundamental principles and processes begin here with: the nature of matter, atomic structure and why some elements are more useful to living things than others, properties of water and the serendipitous size and position of the earth for there to be liquid water and hence for life to exist, the ubiquity of carbon molecules in living systems and their arrangement and interactions in cellular structures. The historical context of discoveries in chemistry (the Periodic Table), cell theory, and ideas about the origins of life are presented as well. These fundamental principles conclude with an examination of making and using chemical energy - a central feature of living organisms. This connects life's processes to the chemistry that underlies it to matters of surprisingly contemporary relevance. Anabolic steroids and their impact on major biochemical pathways, energy use and weight management, and other things important in the lives of our students have a new (and a scientific) context. The impact of life on the nature of the planet is evident too. Photosynthesis produced prodigious quantities of oxygen in the atmosphere which as ozone formed, permitted life on land.

Inheritance, genetics, and - at the conclusion of this section- biotechnology, provide further opportunities to instruct in the fundamental processes that must occur in living things. Cell division is the basis for growth and development, tissue repair, and, when out of control, it's cancer. Peculiar forms of cell division are the basis for sexual reproduction. That leads naturally to not only the specifics of inheritance but to fundamental questions like - given it's cost, why bother with sex in the first place? Inheritance is made relevant by practicing the inheritance of genes of importance to humans - the RH blood group, cystic fibrosis, and sickle cell anemia for example. The nature of the genetic material, DNA at the chemical level, it's discovery and how it could code for traits - come next. It's also of course the crowning achievement of modern biology. The discoveries are fast and furious here

and lead quickly into ethics, economics, and other matters. Note from the collages attached how students learn of both the promise and the problems the future holds (the present for that matter.)

Life, now with a capacity to code for its own structure and function, evolves into a myriad of forms, the successful ones being those that have managed to leave descendants with us today. The diversity of life forms is organized along fundamental phylogenetic principles - the taxa reflect a common ancestry. Paleontological and molecular evidence both contribute to understanding the relationships of organisms in general and humans in particular. That molecular evidence now shows that we probably share a common ancestor several hundred thousand years ago in Africa is better testimony to what we have in common with other races than to any of our differences.

The course concludes with an exploration of the evolutionary processes operating in ecological theaters that explain how life has come to be this way. It concludes with observations of natural selection on human evolution, our impact on ecosystems, the impacts of other organisms on human history, and what the future may hold in light of our past. That the bubonic plague rearranged the social, religious and economic face of Europe is a good example here, and a seemingly innocuous virus that jumped the species barrier in the 1950s threatens to have a similar impact.

2. Elements common to all sections of the course, content, objectives required student activities, grading policies, representative texts and approximate schedule for the course.

The broad outline is common to all sections of the course. Each instructor has different ways to make the same general points. (The examples above are the applicants - Dave Grubbs.) Each section of the course requires exactly the same activities, has exactly the same grading policies, gives the same number of exams weighted alike, uses the same text, and follows approximately the same schedule. The several lecture sections each semester are serviced by a common laboratory. The students in one section are having the same lab experience and completing the same assignments as students in every other section. They are being graded identically and held to the same standards.

3. A typical syllabus is attached for the lecture and lab. The attachments include lecture handouts to demonstrate the satisfaction of the Specifications of the GE Policy and Policies for Inclusion and Evaluation of GE courses.

4. Special cost factors associated with this course. None. We have offered Biology 10 for many years. Enrollment has averaged 1400 students for the last three years.

BIOLOGY 10 - INTRODUCTION TO LIFE SCIENCE

Spring 1997: Tuesday - Thursday Section

David Grubbs Department of Biology S-320 278-2460/2001 email=davidgr

LECTURE:TEXT: Biology: Concepts and Connections, 1994. Campbell, Neil, Lawrence Mitchell, and Jane Reece. Benjamin Cummings Publishing Co.

LECTURE OVERHEADS: Kennel Bookstore Print and Copy Center

EXAM MATERIALS: Scantron #883 -ES (for Essay). and Number 2 pencils.

LABORATORY: Laboratory Manual for Biology 10, Available at Kennel Bookstore

ABOUT THE COURSE: Biology 10 is an introductory course in the life sciences. It's what made me a biologist rather than an attorney or accountant and I believe you study it in very exciting times. I'm sure I can count on your attendance. Bio 10 meets the general education requirement in Area B2. While it is a sound introduction to biology for non-science students, there are other courses that may better meet this requirement for science oriented majors. Consult an advisor if you have any doubts.

The lecture portion of the course is outlined on page 2. Topics are grouped into several major categories. The course is rather heavy on "principles" out of a belief that solid foundations here will best prepare you to appreciate developments and their implications at all levels of biology in the future. The TEXT IS IMPORTANT to me. The text should serve to organize and clarify material from lecture and broaden your perspective of biology in general. The readings listed on the course outline are indications of where the lecture topics are covered in the book. Don't memorize the details but if you'll look over the text before you come to lecture you'll gain a great deal more from the course. Some of the questions on exams come directly from the text, often on subjects I haven't touched at all upon in lecture. I'm especially fond of the "essays", sections that help explain why things are the way they are, and crucial illustrations that clarify major topics. I'll tell you exactly which sections I'll hold you for on exams.

Please come to me for help with the course material. That's what I get paid for. Several TAs will be attending lecture. See them when you can't find me. They get paid too. Finally, a tip - one of the burdens we carry in science is a seemingly complex vocabulary. It's actually rather easy if you'll look up word roots and derivations. The text has a glossary but I find a word root dictionary by Borror of enormous help. It's in the bookstore.

GRADES: The lecture counts for two thirds of your course grade. The lab accounts for the remainder. The lab is important. Biology 10 meets the G.E. requirement for a laboratory course. Thus, you cannot get credit for the course without passing the lab (regardless of how well you do in lecture). The grading standards and other details are common to all sections of the class. Lab grading will be covered when your lab meets.

We give three midterms and a final. The final is comprehensive. We don't give make-up exams. You may miss one if you must because we discard your lowest midterm grade. The average grade on lecture exams will be a "C". I assure this by standardizing or adjusting the "raw" scores just as they standardize the SAT. It's fair and to your benefit in the event I write an impossible exam (that's not uncommon). Talk with me about it if you have any questions about the procedure.

		<u>Grading Standards</u>
Midterm 1 (100 pts)	Tuesday 18 Feb	A= 85 % +.
Midterm 2 (100 pts)	Tuesday 18 Mar	B=75 to 85%.
Midterm 3 (100 pts)	Tuesday 22 Apr	C= 65 to 75%.
Final (200 pts)	Thursday 22 May 1745-1945	D=55 to 65%.
Total (400 pts since we discard the low midterm)		F = 55% or below.

Writing requirement: This is a GE class in Area B2. Such courses require writing assignments that satisfy the two-thousand word General Education Writing Requirement. To meet this standard, the laboratory requires weekly reports on your lab work and an essay on a contemporary topic in life science. The assignment and its integration in the course as a whole is explained in detail in your lab manual.

Other management matters. I support, in letter and in spirit, the university's policies and procedures on grades, withdrawals, incompletes, and its regulations on cheating and plagiarism, conduct and other standards. These matters are addressed in the university catalog and in the Schedule of Classes you used to plan your courses this semester. Please review them if they are not familiar and ask me if any aspect of them is unclear. The catalog and Schedule of Classes also explain your rights as a student under the Family Educational Rights and Privacy Act and The Americans with Disabilities Act. With respect to the latter, contact the appropriate office immediately if you suspect you have a condition which might impact your performance. We can accommodate you if you qualify.

If you wish to drop, have a serious and compelling reason and drop early in the semester. I will not sign drop forms without a report on performance from lab instructors and I can't always reach them during the last few days of the drop period.

BIOLOGY 10 LIFE SCIENCE Spring 1997

DAVID GRUBBS DEPT. OF BIOLOGY NS-318 278-2460/2001

General topics and matching background readings in Campbell, Mitchell, and Reece.
A detailed reading guide will be distributed in lecture.

PART I BASIC PRINCIPLES AND PROCESSES

Some organizational matters, And an introduction to science and life.

Text: Chap 1. Introduction

Physical and chemical foundations. Atoms, molecules, and serendipitous physical conditions

Text: Chap 2. Chemical basis and 3 Molecules of cells

A little biochemistry. Cells the basic units of life, and some structural and functional considerations

Text: Chap 4 Tour of cell and 5 Working cell, and 17 Origin of life.

Cells - Chemical activity, energy, enzymes and life. (*Midterm 1 usually occurs about here.*)

Text: Chap 6 Respiration, 7 Photosynthesis.

PART II. THE CODED INSTRUCTIONS THAT ENABLE ALL THIS.

What genes really do. Genes are the instructions for making proteins. Duplicating and dividing the instructions so descendants can do these things too. It's all cell division, genetics, and sex.

Text: Chap 8 Cellular basis of reproduction.

Genetics and Inheritance.

Text: Chap 9 Inheritance, and 10 Molecular biology of the gene.

DNA - The code itself. Translating and transcribing it. (*Midterm 2 usually occurs about here.*)

Text: Chap 11 Control of gene expression

Gene control, genetic engineering and horizons in genetics.

Text: Chap 12 Technology, 13 The human genome

PART III. THE DIVERSITY OF LIFE

Kingdoms, complexity, and revolutions in the history of life.

Text: Chap 15 The origin of species and 16 Tracing evolutionary history.

The Monera, Protista, Fungi, Plantae, and Animalia. A quick survey. (*Midterm 3 usually occurs about here.*)

Text: Chap 18 Plants, fungi, the colonization of land, and 19 The evolution of animal diversity.

PART IV. HOW THINGS GOT LIKE THIS. ECOLOGY AND EVOLUTION

Evolutionary processes. A matter of leaving successful descendants in real ecological theaters.

Text: Chap 14 How populations evolve.

Ecological theaters - principles and processes. All is this chemistry, genetics, etc. etc. has to work where it really counts. It counts at "home" (the "oikos" or "eco").

Text: Chap 34 The biosphere, 35 and 36 Populations, communities, and ecosystems,

Chap 37 Behavioral adaptations to the environment.

PART V. HOW LIVING THINGS WORK AND WHY THEY WORK THAT WAY.

A collage of anatomical and physiological topics intended to demonstrate the sensible design of it all. (Typically, I will not lecture much on plant and animal biology as separate topics. Bits of this material are woven throughout the course. I do hold you for specific readings in these chapters.

Text: Selections from Plant and Animal biology. Chaps 20 - 30 and Chaps 31 - 33.

PART VI. SPECIAL TOPICS

Selected topics in contemporary biology. The biology of AIDS, nuclear catastrophe, or perhaps biology, medicine and ethics? Topics intended as reviews and extensions of basic principles and processes. I'm open to suggestions on the topics here. Tell me what you want to know about.

Text: Chap 38 Human evolution and its ecological impact.

1. **Quizzes:** Beginning with the second lab meeting, laboratory periods will start with a 5 point quiz consisting of two questions: one based on the previous week's laboratory exercise, and one from the introduction to the current laboratory activity. Be on time or you will miss an opportunity to earn 5 quiz points!!
2. **Laboratory Materials and Write-Ups:** Required texts: (1) *Life Science Laboratory Manual for Biology 10*, William K. Collin, Editor. This semester's edition. (2) *Biology Concepts and Applications*, 3rd edition, Cecie Starr, 1997, Wadsworth Publishing. The Teaching Assistant (T.A.) will introduce each activity. The last 15 minutes of class will be used to discuss questions in the laboratory manual. At the conclusion of the activity, each student will turn in a completed laboratory write-up (torn out of the laboratory manual) to the T.A. Late work will not be accepted. Corrected laboratory write-ups (+, ✓, -, or 0) will be available outside the T.A.'s office 2 days prior to the next laboratory meeting.
3. **Laboratory Examinations:** Three laboratory examinations will be given on the dates listed in the lab schedule. They are worth 40, 40, and 50 points respectively. Questions will be based on 1) assigned text pages, 2) T.A. lectures, and 3) the material from lab exercises including one question from the introduction of the laboratory to be done the day of the examination. There will be no make-up examinations.
4. **Writing Assignment:** A 25 point, three page paper is due in lab at the beginning of your lab time during the week listed in the lab schedule. Specific instructions for the paper are included in your lab manual.
5. **Laboratory Points and Grade Information:** Three (3) absences (excused or not) or three (3) zeros (0's) on the laboratory write-ups will result in a course letter grade drop (e.g. "B" to "C"); five (5) absences or zeros = F for the course. Students must receive a passing grade in lab to pass Biology 10. Those who fail lab (under 55% is failing) receive an F for their Biology 10 course grade.

POINTS FROM LAB WORK			
Quizzes	5 points each X 9	=	45
Laboratory Examinations	50 pts +2 X 40pts	=	130
Writing Assignment		=	25
Total Possible Points in Laboratory			200 pts

Week	Date	Activity	Text Pages to Read
1	26 Jan. - 30 Jan.	Cells - The Basic Units of Life	40-63
2	2 Feb. - 6 Feb.	Movement of Materials Across Cell Membranes	68-72
3	9 Feb. - 13 Feb.	Enzyme Activity	73-78
4	16 Feb. - 20 Feb.	NO LABS THIS WEEK - PRESIDENT'S DAY HOLIDAY	
5	23 Feb. - 27 Feb.	Investigations Relative to Photosynthesis	82-95
6	2 Mar. - 6 Mar.	Respiration in a Green Plant (LAB EXAM #1)	96-112
7	9 Mar. - 13 Mar.	Genetics - Cell Cycle and Reproduction	114-137
8	16 Mar. - 20 Mar.	Inheritance	138-173
9	23 Mar. - 27 Mar.	Population and Evolution	216-237
10	30 Mar. - 3 Apr.	Diversity Among Some Microorganisms (LAB EXAM #2)	284-305
11	6 Apr. - 10 Apr.	NO LABS THIS WEEK- SPRING BREAK	
12	13 Apr. - 17 Apr.	Diversity and Classification of Animals **TERM PAPERS DUE**	326-374
13	20 Apr. - 24 Apr.	Diversity and Classification of Plants	306-325
14	27 Apr. - 1 May	Shaw Habitat Collection	680-707
15	4 May - 8 May	Receptors and Sense Organs (LAB EXAM #3)	542-571
16	11 May - 15 May	NO LABS THIS WEEK - Last Day of Instruction is Wed., May 13th.	

While one TA may appear easier than another, such is not the case since each instructor makes lab challenging enough so that the end of the semester scores average about 70% (C-level work). Lab scores may be adjusted to a 70% average for each TA.

Lab. Instructor* _____ Office Hours _____

Lecture Instructor _____ Office Hours _____

*Learn your lab instructor's name! You must write your lab instructor's name on your lecture exam Scantron to receive your exam grades. Scantrons will returned by your lab instructor.

Term
Paper
Instructions

Instructions for Term Paper

Assignment:

Your term paper must be three typewritten pages in length and can earn you a maximum of twenty-five (25) points. The paper is due on or before the date given in your laboratory syllabus. **Late papers will not be accepted without a severe point penalty.** Five points may be deducted for each day the paper is late. Since this paper is a requirement for the course, failure to turn it in on time is the same as not turning it in at all and may result in a failing grade for the course.

What the
paper is
about:

Your text and the lectures will repeatedly emphasize the fact that an understanding of the principles of science and of biology is important for citizens in a democracy to have. This is because, for better or worse, we live in a time dominated by science and technology and a time when as never before in all of human history, mankind's activities threaten all life on the planet. We live in a time of computers, space vehicles, genetic engineering, global warming, AIDS, atomic energy, species extinction, etc. These are just a very few of the science and biology issues that are in the news almost every day. Not to know about these and not to have some understanding about them is to be ignorant about some of the most significant aspects of our culture.

Source:

For this paper you are to watch for significant items (that is, something that takes more than a few lines in a newspaper) in the current printed media (popular press, **NOT** scientific journals) that have something to do with biology, preferably some aspect of biology that we have studied or will study this semester. For example, the items may be about photosynthesis or genetics or ecology, etc. **Source article should be no more than two pages. The article MUST be current. It must have a publication date after the beginning of the current semester.** This date can be found on the university calander in your schedule of courses.

Clip the item from the paper. If the item you found is in a magazine in the library, for example, do not clip it out and thus damage the

entire magazine. Make a photocopy of the item. Attach the clipping or photocopy to the report you will write. Be sure the date of publication appears on your article. Your typed report should be double spaced and three full pages in length. Short papers will not receive full credit.

Topic:

The report should cover such topics as the significance of the reported item (Why is this important? How might it affect your life? etc.) and how it relates specifically to what you have been reading in the text, hearing in lecture, or doing in the lab. Do not write a report that is little more than a rehash of the article itself — that is, do not paraphrase the article. We will be looking for evidence that you have understood the meaning of the article you read. Our intent is to help you to see that the material of the course has importance and significance to you as an educated person.

Textbook
Reference:

At the end of the report you must list the pages in the textbook that relate to the article in such a way as to aid you in your understanding of the article's content. You must incorporate relevant material from the textbook into your report.

To summarize:

Each student will prepare a three page typewritten report on an item located in the current print media that relates directly to biology. **Clip or photocopy the item and attach it to your report.** The report should focus on the significance of the article and must not be a paraphrasing of the article. At the end of the report you must list those pages in the text that have information bearing on either the article or your report.

Of course it hardly need be said that this is to be written in good English as befits the work of a university student. Immediately begin watching newspapers and magazines for appropriate articles and read related sections of your text. **Don't put it off.**