

General Education Course Approval Cover Sheet

Date of Submission 10/28/2010

1. Check which area(s) this course applies to

- | | | | |
|----------------------------------|-------------------------------------|--|--------------------------|
| Inquiry – Arts & Creativity | <input type="checkbox"/> | Composition & Communications - II | <input type="checkbox"/> |
| Inquiry – Humanities | <input type="checkbox"/> | Quantitative Foundations | <input type="checkbox"/> |
| Inquiry – Nat/Math/Phys Sci | <input checked="" type="checkbox"/> | Statistical Inferential Reasoning | <input type="checkbox"/> |
| Inquiry – Social Sciences | <input type="checkbox"/> | U.S. Citizenship, Community, Diversity | <input type="checkbox"/> |
| Composition & Communications - I | <input type="checkbox"/> | Global Dynamics | <input type="checkbox"/> |

2. Provide Course and Department Information.

Department: Biology

Course Prefix and Number: BIO 103 Credit hours: 3

Course Title: Basic Ideas in Biology

Expected # of Students per Calendar Yr: 1500 Course Required for Majors in your Program (check one)? Yes No

Prerequisite(s) for Course? none

This request is for (check one) A New Course An Existing Course

Departmental Contact Information


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Office Address: 101 Morgan Building Phone: 257-7647

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including a mapping of the stated learning outcomes to those presented on the corresponding Course Template.
- A completed Course Review Form. See the Gen Ed website <http://www.uky.edu/gened/forms.html> for these forms. Proposals prepared prior to September 15th, 2010 are allowed to use a narrative instead of the Course Review Form.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair:  Date: Oct 29 2010

Dean:  Date: 11/5/10

*revid
11/2/10
submitted
GEOC
11/5/10*

All proposals are to be submitted from the College Dean's Office
Submission is by way of the General Education website <http://www.uky.edu/gened>

**Course Review Form
Inquiry in the Natural/Physical/Mathematical Sciences**

Course Name: Basic Ideas of Biology

College: Arts and Sciences

For Review Committee Use Only

Accept Revisions Needed

Using the course syllabus as a reference, identify when and how the following learning outcomes are addressed in the course. Since learning outcomes will likely be addressed multiple ways within the same syllabus, please identify a representative example (or examples) for each outcome.

- Course activities that enable students to demonstrate an understanding of methods of inquiry that lead to scientific knowledge and distinguish scientific fact from pseudoscience.

Example(s) from syllabus:

Characteristics of science written report and logical fallacy/pseudoscience written report

Brief Description:

Initial class sessions in BIO 103 are devoted to discussing the methods of scientific research. The nature of science is a theme that runs through the course. The first written report requires students to identify characteristics of science in a Biology news article and explain how they are illustrated. The second written report asks students to identify logical fallacies and pseudoscientific statements in a Biology case study.

- Course activities that enable students to demonstrate an understanding of the fundamental principles in a branch of science.

Example(s) from syllabus:

Exam questions and student research projects

Brief Description:

An understanding of fundamental principles of energy flow, genetics, evolution and ecology is assessed in exam questions that ask students to define and recognize examples of principles such as the laws of thermodynamics or evolution through natural selection. The student research projects require that students state and define what biological principle(s) were used in the generation of the hypothesis they are testing.

- Course activities that enable students to demonstrate the application of fundamental principles to interpret and make predictions in that branch of science.

Example(s) from syllabus:

Exam questions and student research projects

Brief Description:

Applications of fundamental biological principles are assessed in exam questions that describe biological phenomena such as ecological situations involving predation or competition and ask students to interpret the population dynamics and predict the outcome. The student research projects will require that students use biological principles to both predict and interpret their research outcomes.

- Course activities that enable students to demonstrate their ability to discuss how at least one scientific discovery changed the way scientists understand the world.

Example(s) from syllabus:

Paradigm shift discussions concerning genetics and evolution

Brief Description:

In both the genetics and evolution sections of the course, the historical development of theories from ancient Greek concepts to current scientific models is addressed and students are asked to discuss these paradigm shifts with peers during class explaining how the new models offer better interpretations and predictions than the old theories. Students are also tested on this understanding on exam questions.

- Course activities that enable students to demonstrate their ability to discuss the interaction of science with society.

Example(s) from syllabus:

Class discussions and debates on biotechnology, evolution and climate change

Brief Description:

The topics of biotechnology, evolution and climate change offer excellent opportunities to explore the nexus of science with politics, economics, religion, ethics and law. For each of these course topics there is a class period specifically devoted to an open forum that addresses topics such as stem cells, intelligent design and global warming. Students are encouraged to express opinions on these issues (which they do in spite of the class size) and to do some prior investigation on arguments for and against the issues.

- A hands-on student project is required. This project enables students to demonstrate their ability to conduct a scientific project using scientific methods that include design, data collection, analysis, summary of the results, conclusions, alternative approaches, and future studies. Describe the required student product (paper/ laboratory report) based on the hands-on project.

Students will work with online biological simulations on topics such limiting resources and pollution that allow the student to propose an original hypothesis and test it through the manipulation of the multiple variables that these sophisticated simulations allow. Students will present their research in the form of a scientific paper with literature review formatted as a peer-reviewed scientific publication.

- Course activities that demonstrate the integration of information literacy into the course.

Example(s) from syllabus:

Written reports on a Biology news article and web site critique plus student research projects

Brief Description:

Find information that supports or refutes their news article. Critique a biological web site according to variables such as authorship, purpose, bias and credibility. Provide a literature review for the research project.

Reviewer's Comments

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BIOLOGY 103 (Section 001) - Basic Ideas of Biology

Fall 2010 Syllabus

Course Information:

Time: MWF 9:00 – 9:50 a.m.
Room: 107 Biological Sciences
URL: <http://www.uky.edu/~burke/bio103>

Instructor Information:

Instructor: Bill Burke
Office: 518D King Library
Office Hours: Tu / W 2:00 - 4:00 pm
Phone: 257-8039
E-mail: burke@uky.edu

Biology 103 is an introductory biological science course designed for non-science majors. It satisfies the general education requirement for intellectual inquiry in the natural, physical and mathematical sciences. Science is a major human activity and influence in the world. Whether you are a scientist or not, science affects you - the way you live, the nature of your society, the way you think, and the way that you perceive the universe. Consequently, it is important that the non-scientist understand the nature of this activity called "science" and something of the subject matter with which science is involved. The biological sciences have become particularly important and newsworthy at the beginning of the 21st century given the research in and implications of environmental and biotechnology research. A scientifically literate citizen will need basic biological information and an understanding of how science operates to interpret news stories and make intelligent medical, environmental, economic, and political decisions.

I hope you find this course challenging, exciting and interesting. I hope the topics pique your curiosity, enrich your understanding of science, intrigue you, and, most of all, make you think! Life is all around you as well as within you. You are a part of the whole global web of life. In some ways, you are unique. In many ways, you share common features with all living things. We will explore the nature of science and life in this course. Please get involved and participate in the class. Here's to an intellectually stimulating and enjoyable semester for all!

Course Goals

- 1) To provide knowledge about --
 - a) The nature of science to include: its assumptions, characteristics, goals, and limitations; how models are built and modified to explain and predict natural phenomena; the distinction between scientific research and pseudoscience; and the difference and similarities of scholarship in science versus other fields of inquiry
 - b) Biological concepts and terminology including facts, laws, and theories concerning characteristics of life, genetics, evolution, behavior, and ecology
 - c) The historical development of biological ideas
 - d) New biological theories and areas of research such as in molecular genetics and genetic engineering
 - e) Science/society interactions including the ethical, legal, and economic implications of areas such as biotechnology and environmental research
- 2) To enhance skills in communicating ideas and critically evaluating sources of information, arguments, and issues such as global warming and genetic manipulation
- 3) To promote the values of curiosity, openness to new ideas, skepticism and science as a way of knowing

Learning Outcomes

By the end of the course, you should be able to:

1. Describe methods of inquiry that lead to scientific knowledge and distinguish scientific fact from pseudoscience.
2. Explain fundamental principles of biological sciences.
3. Apply fundamental biological principles to interpret data and make predictions.
4. Demonstrate an understanding of scientific discoveries that changed the way scientists understand the world.
5. Give examples of how science interacts with society.
6. Conduct a hands-on project using scientific methods to include design, data collection, analysis, summary of the results, conclusions, alternative approaches, and future studies.
7. Recognize when information is needed and demonstrate the ability to find, evaluate and use effectively sources of scientific information.

Textbook

The textbook is a customized publication with selected chapters taken from Starr, C., Taggart, R., Evers, C.A. & Starr, L. (2009). *Biology: The Unity and Diversity of Life* (12th Edition). Pacific Grove, CA: Brooks/Cole Cengage Learning. Ordering this customized publication cut your cost for the textbook in half. In addition to containing subject matter that we will discuss in class, the text includes some material that we will not discuss and omits other material that we will only cover in class. You are responsible for knowing any material covered in class (which the textbook may also cover) as well as any specifically assigned readings beyond the general chapter readings. The textbook is intended to be a supplement to and not a substitute for class attendance and discussion.

Office Hours

It has been my experience that the system that works best for all concerned is a combination of scheduled open office hours and appointments. I will be available in my office on Tuesday and Wednesday, 2:00 - 4:00 p.m. You may also come to my office at any time and see if I am available for consultation or, better yet, request an appointment by e-mailing or phoning me or talking to me after class. In addition to face-to-face meetings or phone conversations, e-mail can be very productive. Please allow up to two workdays for an e-mail response. All e-mail must have a relevant subject line and must identify who you are by having your name somewhere in the message.

Academic Accommodations

If you have a documented disability that requires academic accommodations, please see me as soon as possible. In order to receive accommodations in this course, you must provide me with a *Letter of Accommodation* from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@uky.edu) for coordination of campus disability services available to students with disabilities. We can then collaborate on the best solution.

Attendance

Given the large class size, attendance is not taken. Attendance and participation, however, are key strategies for doing well in the course. Class sessions will involve lecture and an assortment of active learning activities that contribute to making the course content more meaningful. Exam questions come from material covered during the class periods and any assigned online readings. Some of the material discussed in class is unique to this course and not found in other sources. Missing class and depending on the notes of friends or a lecture note company is a risky venture and eliminates the opportunity to make personal meaning of the material through your own notes and participation in class activities.

Exams and Assignments

Grades will be based on the following exams and assignments:

Assessment	Number of points	Percentage of Course Grade
Exam 1	30	10%
Exam 2	30	10%
Exam 3	30	10%
Final Exam	60	20%
Written Report 1	15	5%
Written Report 2	15	5%
Written Report 3	15	5%
Written Report 4	15	5%
Written Report 5	15	5%
Research Paper	75	25%
Total	300	100%

Exams: There will be three exams during the semester worth 30 points each. Each exam will have 30 multiple-choice questions worth 1 point each. Each exam will cover only the material from that section of the course. The final exam will consist of 60 multiple choice questions at one point apiece. Half of the multiple-choice on the final will cover old material (modified questions from the previous exams) and half will cover new material. Only one make-up exam (an essay test) will be allowed and only for documented, excused absences as defined in Student Rights and Responsibilities (<http://www.uky.edu/StudentAffairs/Code>). The exam must be scheduled before or immediately after the class exam.

Questions on exams will come from material covered in class or from specifically assigned readings (beyond the general chapter readings listed in the schedule). Some of the material is only available through our class discussions and activities. The exam policy is – if we covered it in class or if it was specifically assigned as an online reading, it is testable.

Given the large class enrollment, the test questions are multiple choice questions based on the material presented in class. However, the questions are not simply the rote memorization kind, but rather test your comprehension of the information and your ability to apply the material in a problem-solving fashion. Sample questions will be discussed in class and are available on the Web site for this course.

Exam questions that received low scores will be discussed in class at the class period following the exam. Given that the final exam is cumulative, attendance at this session is valuable. You may also e-mail me regarding answers to exam questions either to get clarification or to argue for credit. I don't respond to queries, however, until we have had a chance to discuss the questions in class. You may discuss exam answers with me at any time during the semester up until the day of the final exam.

Written Reports: There will be five short written reports (1-2 pages each) worth 15 points each. The assignments are due on non-exam days as noted in the syllabus. Unexcused late papers are not acceptable. The topics for these papers are: a) News Article - summarize, locate three characteristics of science, find a web site with information related to the news article; b) Case Study - locate examples of logical fallacies and pseudoscience traits; c) Web Site - summarize and critique (according to assigned criteria) a biological web site; d) Environmental Audit - take an online assessment of your environmental footprint and how it might be reduced; and e) Reflective Statement - write a personal, reflective statement concerning connections between course materials and your life. Specific instructions will be discussed in class and are available on the course Web site.

Research Paper: You will be assigned an ecological topic to investigate such as predator/prey interactions, pollution or limiting resources. Background information will be provided to familiarize you with the specifics of the study. Based on those details and additional information that you will acquire from the literature and online resources, you will propose a hypothesis to test. Following approval of your hypothesis, you will download an online simulation and test the hypothesis by manipulating the appropriate variables. You will collect the data, analyze and summarize it, draw appropriate conclusions, and suggest further studies that might be conducted. The results will be submitted as a scientific research paper. The assignment is worth 75 points. Specific instructions will be discussed in class and are available on the course Web site.

Extra Credit: There will be ten unannounced quizzes in class worth one point each for up to 10 extra credit points. These quizzes will not be graded according to right or wrong answers. They are formative (not summative) assessments that will familiarize you with my exam questions and give you feedback as to your understanding of the material.

Grades

Course grades are assigned according to the following criteria. The grades are not norm-referenced or curved. They are criterion-based using your performance on exams and papers.

Course Grade	Percentage	Points
A	90% or better	270 – 300
B	80 – 89%	240 – 269
C	70 – 79%	210 – 239
D	60 – 69%	180 – 209
E	Below 60%	Less than 180 points

Students with borderline grades at the end of the semester (i.e., within 2% of the next higher grade) may be considered for the higher grade if certain criteria are met. All exams must have been taken and all written reports must be submitted on time. I will review such cases on an individual basis and look for borderline causes such as one low exam pulling a grade down when the rest of the exam grades are fairly consistent, gradual improvement in exam grades during the semester bringing the course grade up to borderline or consistent grades with a strong performance on the final exam resulting in a borderline course grade.

Classroom Courtesy

Given the large enrollment in this class and the nature of the large lecture hall I'm requesting your cooperation in making the learning environment as effective and courteous as possible. Please be respectful to others in the class and engage in civil discourse when we discuss topics that have a diversity of perspectives. Please minimize distractions by not reading newspapers or carrying on conversations and be discreet if you must arrive late or leave early. Turn mobile phones off during class. Please help me maintain the best environment by using a little peer pressure if necessary. This is a challenging teaching and learning environment so let's be as courteous as possible. Thank you.

Plagiarism and Cheating

Cheating on exams or submitting written assignments that are not your own original work constitute grounds for failing this course and possibly further academic actions. If you use another's ideas in a paper, perhaps by paraphrasing their thoughts, cite the reference. Obviously, if you directly use another's text, place it in quotations and cite the reference. If you are suspected of cheating during an exam, you will be assigned a failing grade for the course. Talking to another student during the exam, looking at another student's paper, using supplementary material, or using a surrogate test-taker all constitute cheating. Consult the *Student Rights and Responsibilities* manual (Part II, Section 6) for further details. (Available on the Web at <http://www.uky.edu/StudentAffairs/Code>)

Strategies for Success

1) Attendance & participation

Class activities (exercises and discussion in class) contribute to your overall understanding of course material. They provide an opportunity to make personal meaning out of the content. "Getting" the material is not simply a matter of getting the notes from another student or, worse yet, from a commercial notes company which has no stake in your success in the course. Personal notes and active participation (even if it's thinking to yourself if not answering out loud) contribute to success. Take advantage of the participation opportunities offered during class time.

2) Note-taking & meaning-making

Do more than take *verbatim* notes directly from the overhead transparencies or PowerPoint slides. Take notes on what is being said in class as well. Practice becoming more efficient at note taking by paraphrasing and abbreviating (e.g., use abbrev for biol wds & reg wds). It's a good skill to have. Review your notes on a regular basis as soon after the class as possible (not just before exams) and make personal meaning of them by adding comments, questions, summaries, and symbols in the margins.

3) Critical reading

Although there is no textbook for this course, the following is a good strategy for your other classes. Painting a textbook with a highlighter (even if it's a great color) is reading only in a very surface manner. It's not deep reading for meaning. Be selective and interactive. Mark up the text with comments, questions, and symbols to make personal meaning of it. Even if you sell the book back at the end of the semester (which is unlikely since it could be such a valuable addition to your personal library), the bookstore won't give you any less money for it because it has notes in it. And, if the next student is smart, they won't buy your used copy, but rather a clean copy so they can make their own meaning out of it.

4) Study time

A survey of UK first year students revealed that 70% studied 10 hours or less per week. What is commonly recommended is at least 2 hours/1 hour of class or at least 30 hours/week for a 15 credit hour load. Whatever you actually study, a consistent regimen is best. Whatever other jobs you may hold, being a student should be considered a full-time job involving 40 hours per week including class and study time.

5) Consultation with instructor

I'm here. Use office visits or e-mail. Contact me as soon as possible if you are having problems with the course. Please don't wait until the end of the semester.

6) Study groups

This could be a very good supplement to your individual study. I'll help set them up if you like.

7) Exam-taking

Make several passes on multiple-choice questions eliminating choices and making selections. Read the questions carefully. Pause, make sure you understand the question, and even try to answer it before looking at the choices. Even with all the test anxiety that might be present, pause and reflect before jumping to an answer. Ask me for clarification if needed.

8) Motivation

Attitude can make a big difference. What's your personal motivation? What's your perception of your potential? What could you get out of this course in addition to satisfying a core requirement?

9) Productive Effort

Attending class, reading the text, and studying your notes count to the extent that they are productive. In and of themselves, however, they don't necessarily lead to success. Simply attending all classes or reading all the chapters will not be productive unless done so meaningfully. Attend and participate. Read and question. There is no separate grade for effort. Effort is graded through your performance on exams and written reports.

10) Responsibility

Responsibilities exist for both instructors and students. I will --organize and present content and activities; administer ways to assess understanding; be available for assistance; and do my best to be knowledgeable, fair, clear, organized, and enthusiastic. Please do your part -- attend class, take good notes and review them, and participate in class by asking and answering questions and engaging in the active learning exercises.

BIO 103 (001) Course Schedule / Fall 2010

Classroom discussions on particular topics and relevant events that appear in the news may alter the schedule a bit.

DATE	TOPIC	READING
Aug. 25	Student survey and review of course goals, activities, and assessments Overview of science, Biology and life	Syllabus
Aug. 27	Science as a way of knowing -- the who, what, when, and where of science	Chapter 1
Aug. 30	Characteristics of scientific method and philosophy	Class Notes
Sept. 1	Why & how of science - problem-solving, paradigm shifts, building models	Class Notes
Sept. 3	Science and pseudoscience Logical fallacies and the critical examination of arguments	Class Notes
Sept. 6	Academic Holiday	-----
Sept. 8	Biology as a science and the characteristics of life	Chapter 1
Sept. 10	Atoms, molecules, biological building blocks and polymers Written Report #1 Due - Biology News Article and Characteristics of Science	Chapters 2 & 3
Sept. 13	Cells and laws of thermodynamics	Chapters 4 & 5
Sept. 15	The flow of energy - photosynthesis and cellular respiration	Chapters 6 & 7
Sept. 17	Exam 1	-----
Sept. 20	Early inheritance paradigms - Aristotle, homunculi, blending inheritance	Class Notes
Sept. 22	Classical genetics - Mendel's paradigm shift & formation of genetic laws	Chapter 10
Sept. 24	Mendel validated - chromosomes; mitosis & meiosis	Chapters 8 & 9
Sept. 27	Beyond Mendel - exceptions to the basic laws	Chapter 10
Sept. 29	Molecular genetics - the race to discover the code of life Written Report #2 Due - Logical Fallacies in an Argument on GMFs	Chapter 12
Oct. 1	Genes as protein factories	Chapter 13
Oct. 4	Errors in the code and resulting abnormalities	Chapter 11
Oct. 6	Assisted reproduction (surrogate mothers, <i>in vitro</i> babies, cloning)	Class Notes
Oct. 8	Biotechnology -- genetic fingerprinting, modified foods, genetic cures	Chapter 14
Oct. 11	Ethical, legal, and environmental questions raised by biotechnology research	Class Notes
Oct. 13	Exam 2	-----
Oct. 15	Unity and diversity of life / Classifying species	Chapter 17
Oct. 18	Early evolution paradigms -- Anaximander to Lamarck	Chapter 15
Oct. 20	Darwinian paradigm shift -- natural selection as a model	Chapter 15
Oct. 22	Mechanisms of evolution - populations, genes, and selection	Chapter 16
Oct. 25	Mechanisms of evolution - genetic drift, reproductive isolation, adaptive radiation	Chapter 16
Oct. 27	Evidence for evolution and natural selection	Chapter 15
Oct. 29	Creationism and intelligent design - topics for a science classroom? Written Report #3 Due - Summary and Critique of a Biology Web Site	Class Notes
Nov. 1	Behavioral ecology - nature and nurture	Chapter 18
Nov. 3	Animal behavior -- difference in kind or degree?	Chapter 18
Nov. 5	If I could talk to the animals -- Clever Hans and signing apes	Class Notes
Nov. 8	Critical examination of animal language studies	Class Notes
Nov. 10	Exam 3	-----
Nov. 12	Population ecology	Chapter 19
Nov. 15	Community ecology	Chapter 20
Nov. 17	Ecosystems	Chapter 21
Nov. 19	The case for protecting biodiversity	Chapter 22
Nov. 22	Ozone layer disruption - an ecological success story	Class Notes
Nov. 24	Independent home study of predator-prey interaction between <i>Homo sapiens</i> and	-----
Nov. 26	<i>Meleagris gallapavo</i> (Holiday. Thanksgiving. No class session.)	
Nov. 29	Critical examination of climate change and global warming	Class Notes
Dec. 1	The greening of the world Written Report #4 Due - Personal Environmental Audit	Class Notes
Dec. 3	Open forum - your biological questions	-----
Dec. 6	Hawai'i -- a living laboratory for genetics, evolution, and ecology	Class Notes
Dec. 8	Hawai'i -- native and alien species	Class Notes
Dec. 10	Hawai'i -- a metaphor for Earth and a case study of ecological disruption	Class Notes

FINAL EXAM: Wednesday, December 15, 10:30 a.m. - 12:30 p.m., 107 Biological Sciences (Written Report #5 Due)