

Current Information:I. A.) COURSE NUMBER, and TITLE: BSC 2930 (Var. Top.) Introduction to GenomicsB.) CREDIT HOURS: 3 C.) PREREQUISITES: None

D.) CURRENT CLASSIFICATION

1. General Education Code: B C D H M N P S None2. Writing Requirement: E2 E4 E6 None3. Math Requirement: M None**Requests:**

II. GENERAL EDUCATION

A.) Requested Classification: B C D H M N P SB.) Effective Date: Fall Spring Summer 2011 (year) 1-time Approval _____ (year)
OrIII. WRITING REQUIREMENT MATH REQUIREMENT A.) Requested Classification E2 E4 E6B.) Effective Date: Fall Spring Summer _____ (year) 1-time Approval _____ (year)
Or

C.) Assessment:

1.) What type of feedback will be provided to the student (in reference to writing skill)?

_____ Grade _____ Corrections _____ Drafts _____ Other

2.) Will a published rubric be used?

IV. ATTACH A DETAILED SYLLABUS

V. SYLLABUS CHECKLIST

Courses that offer students General Education and/or Writing Requirement credit must provide clear and explicit information for the students about the classification and requirements.

A.) For courses with a **General Education** classification, the syllabus should include:

- Statement of the General Education Purpose of the Course with attention to the General Education Classification requested
- List of assigned General Education Student Learning Outcomes
- List of any other relevant Student Learning Outcomes
- List of required and optional texts
- Weekly course schedule with sufficient detail (e.g. topics, assigned readings, other assignments, due dates)

B.) For courses with **Writing Requirement (WR)** classification, the syllabus should include:

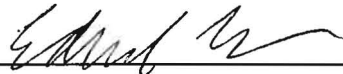
- "The Writing Requirement ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning."
- "Course grades now have two components: To receive writing credit, a student must receive a grade of "C" or higher and a satisfactory completion of the writing component of the course."
- A statement or statements indicating that the instructor will evaluate and provide feedback on the student's written assignments with respect to grammar, punctuation, usage of standard written English, clarity, coherence, and organization
- Assignment word counts, page lengths, submission deadlines and feedback dates


Additionally, the syllabus must clearly show that the course meets the WR to

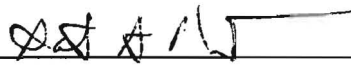
- Evaluate [2,000/4,000/6,000] written words in assignments during the semester
- Provide all feedback on assignments prior to the last class meeting

Important note: The following types of writing assignments **CANNOT** be used to meet the WR: teamwork, exam essay questions, take-home exams, and informal, ungraded writing assignments.

VI. SUBMISSION AND APPROVALS

A.) Submitted by (Signature of Instructor): 
Print Name Edward Braun Date 27 April 2011

B.) Department Approval (Signature): 
Print Name David Julian Date 27 April 2011

C.) College Approval (Signature): 
Print Name David A. Pharies Date 27 April 2011

D.) Committee Action: Approved Denied Tabled Date _____

BSC 2930, Section XXXX

Introduction to Genomics: from Phages to Personalized Medicine (for non-majors)

Description

Students will be introduced to the science of genomics by sequencing and analyzing the complete genome of a novel bacterial virus. The course will include discussions of topics ranging from genomes and biotechnology to human health and the environment.

Credit Hours

03

Pre-requisites and Co-requisites

None

General Education Requirement

This course meets three credits of the General Education requirement in Biological Sciences. Courses that meet this requirement provide instruction in the basic concepts, theories and terms of the scientific method, and focus on major scientific developments and their impacts on society, science and the environment. In this course, you will formulate empirically-testable hypotheses derived from the study of physical process and living things and you will apply logical reasoning skills through scientific criticism and argument.

Course Overview

The science of genomics is revolutionizing all aspects of biology, ranging from topics as diverse as medicine to biodiversity and ecology. The decrease in costs for genome sequencing have been staggering; whereas the cost of the first human genome sequence was \$2.7 billion (in 1991 dollars) the current cost to sequence a human genome is <\$50,000. It will be possible to sequence genomes as a routine medical test, giving doctors and other health care workers access to unprecedented amounts of information. It will be critical for all citizens to understand the impact of this technology upon their lives; this course will provide an introduction to this topic.

The costs to sequence organisms with smaller genomes is even less, and this course will immerse non-majors in an exciting effort to sequence and analyze the genomes of bacteriophages (bacterial viruses) that infect non-pathogenic relatives of the bacteria that cause tuberculosis and leprosy. The opportunity to work with viruses that infect safe-to-handle relatives of these fascinating bacteria, provided in part by funding from the Howard Hughes Medical Institute (HHMI), will provide a unique educational experience.

Efforts to characterize the genomes of novel and uncharacterized organisms, like the bacteriophages that represent the focus for the laboratory portion of this course, are still part of cutting-edge ongoing research efforts. Since this course is supported by HHMI, the students will also have the

opportunity to interact online with students engaged in similar inquiry laboratory courses located at Universities and Colleges across the country. This course will give students an opportunity to work on a cutting edge scientific project and be exposed to an exciting picture of 21st century biology.

Course Objectives

By the end of the course, the student will be able to do the following:

- Describe the scientific method and the distinction between discovery-based research and hypothesis-based research.
- Formulate a scientific hypothesis, design an experiment to test that hypothesis, and critically evaluate the results.
- Explain the theory and practice of genomics and its role in the broader context of ecology, evolution and health.
- Explain the basic principles of gene expression, translation, and DNA/RNA replication.
- Understand that infectious diseases have an underlying molecular basis.
- Understand the basic biotechnology of genetically modified organisms.
- Critically evaluate the factual basis of claims when discussing the ethical, legal, and social implications of biotechnology and genomics.

Instructor Information

Name: Edward L. Braun
Office location: 514 Carr Hall
Telephone: 352.846.1124
E-mail address: ebraun68@ufl.edu
Web site: <http://people.biology.ufl.edu/ebraun>
Office hours: TBA

Name: W. Bradley Barbazuk
Office location: 407 CGRC
Telephone: 352.273.8624
E-mail address: bbarbazuk@ufl.edu
Web site: <http://barbazuk.bioinformatics.ufl.edu/>
Office hours: TBA

Teaching Assistant Information (if applicable):

Name: Jessica Sabo
Office location: TBA
Telephone: TBA
E-mail address: jsabo@ufl.edu
Office hours: TBA

Course Meeting Time(s)

The lecture portion of the course will meet once per week for one (1) hour. The lab portion of the course will meet once per week for four (4) hours.

Course Meeting Location(s)

UF-HHMI Undergraduate Core Laboratory (JG05A/B)

Course Website

Course materials and related information will be posted on the course E-Learning (Sakai) website at <http://lss.at.ufl.edu>. You are responsible for all announcements made in class and/or posted on the course website for this course.

Fees

NONE

Required Materials

Readings will be provided with the course, including the HHMI SEA NGRI Phage Resource Guide. The readings will comprise a selected set of papers from peer-reviewed journals, popular science writing, vetted web sites with a science education focus, and science journalism. The readings will often be linked (e.g., readings focused on contamination in genome databases will use both a NY Times article describing the problem and the PLoS ONE paper that provides details; the readings for biodiversity genomics will use papers from Science [a science news feature and a research paper on the avian tree of life] and Nature [a research paper on the animal tree of life]).

Bound hardcover laboratory notebook

Course Outline (topics covered by week)

Week	Topic
1	Fundamentals of cellular and molecular biology READING – public reactions to genetically modified organisms (GMOs) LAB – Course overview and safety lecture. LAB – Distribute phage collection tools. Collect environmental samples
2	Introduction to genetic engineering READING – contamination in genome sequences LAB – Extract samples, plate for plaques. Pick plaques; perform plaque assay LAB PROGRESS REPORT I due
3	Genome sequencing READING – biodiversity genomics and phylogenomics LAB – Pick purified plaques; infect cells and harvest 1-plate lysate; titer lysate
4	Biodiversity – a genomic perspective READING – emerging pathogens I LAB – Titer lysate
5	TEST I LAB – Set up and harvest 10-plate lysate
6	Social impact of infectious diseases READING – microbial evolution; horizontal gene transfer LAB – Electron microscopy
7	Genomes and evolution READING – metagenomics LAB – DNA quality control LAB PROGRESS REPORT II due
8	Genomes and the environment READING – emerging pathogens II LAB – Extract, purify, and quantify DNA. Restriction analysis and electrophoresis
9	The intersection of genomes, ecology, evolution, and disease READING – genomics, privacy, and medical care LAB – DNA quality control. Class presentations begin
10	TEST II LAB – Class presentations
11	Ethical, legal, and social impact of genomics READING – genomics and the law LAB – Class presentations
12	Genetic and forensics READING – synthetic biology and artificial life LAB – Class presentations
13	Panel discussion: gene patents LAB – Class presentations LAB PROGRESS REPORT III due
14	Panel discussion: genomics, health, and privacy LAB – Class presentations
15	FINAL ALL LAB PROGRESS REPORT revisions are due

Attendance Policy

Class attendance is required. Students are expected to attend lectures unless other arrangements are made. Please read the assigned chapters before coming to class or logging on, since this will make it easier to comprehend the lecture material.

Conduct in Class

- Participate in discussions and ask questions. Be prepared to discuss readings before the class meets; most readings are assigned the week before they will be covered. Please be courteous to other students during the class, but make sure you engage with both the other students and the instructor.
- We will hold panel discussions focused on issues such as gene patents and genomics and medicine. These discussions will ultimately focus on the intersection of public policy and science. Make sure you have completed readings before the discussions and feel comfortable with the factual claims you will use to back up your opinions. You will be expected to complete a written summary of your points of view before the discussion and then finish it by revising it in light of the discussion before turning it in.
- Tardiness is disruptive for the lecture. Frequent tardiness will not be tolerated. Five points per occurrence will be deducted from the student's overall score after the third occurrence of being late to class.
- Only approved electronic devices may be used in class. Approved electronic devices are laptop computers (when used to participate in classroom activities) and voice recording devices. Unapproved electronic devices include cell phones, video recorders, digital cameras and MP3 players.

Grading

- Tests: 2 tests (20% of final grade)
- Quizzes: 10 quizzes (10% of final grade)
- Final Exam: 10% of final grade
- Laboratory Notebook: 15% of final grade
- Lab Progress Reports: 10% of final grade
- Lab Presentations: 2 presentations (20% of final grade)
- Class Participation: 10% of final grade
- Participation in panel discussion: 5% of final grade
- **Bonus Points:** Students have the opportunity to receive bonus points by participating in the HHMI SEA NGRI Question of the week online. Each week a new question is posted and all students have the opportunity to respond by the deadline posted. Students participating in the question of the week will earn one bonus point for each question they answer online. Only 1 bonus point can be earned each week. HHMI also rewards the first correct answer from each university with a prize, so there is an extra incentive to participate in the Question of the Week!

Description of Assessment Criteria Used to Assign Grades

- **Tests:** There will be two tests, comprised mostly of a series of questions with approximately one-paragraph answers expected. The focus of these exams will be critical thinking, the synthesis of concepts, and the students' ability to present this information. The exams will be given during the lecture period.
- **Quizzes:** There will be 10 short quizzes that will be given online using a multiple choice and short answer format. The purpose of the quizzes is to ensure continued engagement with readings and lecture/laboratory materials.
- **Final Exam:** There will be a comprehensive final exam with the same format as the two tests.
- **Laboratory Notebook:** Maintaining an accurate and complete laboratory notebook is critical in the sciences. Notebooks will be examined periodically to ensure accurate record keeping and students will be reminded of the standards for good scientific record keeping throughout the course.
- **Lab Progress Reports:** Progress reports will give students a chance to place their laboratory work in the context of broader hypotheses, so these are complementary to the lab notebook. The focus of these reports will be descriptions of hypotheses and the ways the lab experiments address those hypotheses.
- **Lab Presentations:** Students will be responsible for two presentations of readings from the scientific literature (typically news features from journals like *Science* and *Nature*). The presentations will be 10 minutes in duration with approximately five minutes of questions afterward.

Grading Scale

Point Range (%)	Letter Grade	GPA equivalent
≥ 90.00	A	4.0
86.7 – 89.9	A-	3.67
83.3 – 86.6	B+	3.33
80.0 – 83.2	B	3.0
76.7 – 79.9	B-	2.67
73.3 – 76.6	C+	2.33
70.0 – 73.2	C	2.0
66.7 – 69.9	C-	1.67
63.3 – 66.6	D+	1.33
60.0 – 56.7	D	1.0
56.7 – 52.9	D-	0.67
< 52.9	E	0

Note that a "C-" will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation

requirement. For more information on grades and grading policies, please visit:
<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Grade Curve Policy

Curves will be applied to each individual test when warranted based upon an evaluation of the maximum score and/or mean.

Make-up Exam Policy

Make-up exams will not be given without prior permission and/or a note from your physician is required. Make-up exams given to accommodate personal matters require a note from the Dean of Students (P202 Peabody Hall). The format of make up exams will be at the instructor's discretion.

UF Counseling Services

- Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
- Many students experience test anxiety and other stress related problems. "A Self Help Guide for Students" is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: <http://www.counsel.ufl.edu/>.

Honesty Policy

- All students registered at the University of Florida have agreed to comply with the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."
- In addition, on all work submitted for credit the following pledge is either required or implied: *"On my honor I have neither given nor received unauthorized aid in doing this assignment."*
- If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at: <http://www.dso.ufl.edu/judicial/procedures/academicguide.html>.

Accommodation for Students with Disabilities

- Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: <http://www.dso.ufl.edu/drp/services/>.

- It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.