



**EHSC 4710/6710
Environmental Biotechnology
Fall, 2008 Syllabus**

Course Information

Instructor: Travis C. Glenn
Office Location: 140 EHS
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Email: TravisG@uga.edu
Office Hours: Tu/Th 1-2 & by appointment

Course Meeting Time and Location

Building: Environmental Health
Room: 120

Day: Tu/Th
Time: 2:00 - 4:45 pm

Textbooks and Other Required Course Material

Reading materials will be given in class, e-mailed, and posted to web sites or ftp sites. Specific directions will be given in class and/or via e-mail.

Course Description

Integrated lecture/laboratory course covering the use of molecular genetic tools to solve ecological, environmental, and public health issues. Provides detailed insight for applications and use of molecular genetic tools and hands on experience. Intended to provide relevant training and experience for laboratory based graduate studies and careers.

Pre-requisites: BIOL 1103 or 1107, and 1104 or 1108; CHEM 1110L, 1211L or 1311L; and GENE (BIOL) 3200 or EHSC 4700/6700 or similar courses (i.e., 1 year introductory biology, introductory chemistry lab, and a course in genetics)

Course Learning Objectives

Upon successful completion of this course, the student should be able to:

- Make solutions used in molecular genetics laboratories
- Understand and apply laboratory techniques used in nucleic acids research including:
 - DNA & RNA isolation
 - Agarose Gel & Capillary Electrophoresis
 - Restriction Enzyme Digestion and Ligation
 - Polymerase Chain Reaction
 - DNA Hybridization and Capture
 - Cloning Plasmids in E. coli
 - Single-sample and massively parallel DNA Sequencing
 - PCR Primer and Probe Design

DNA Diagnostics Assays
DNA Fragment Analysis (microsatellite DNA Loci)
Quantitative Real-Time PCR
Micro- and Macro-arrays

--Understand and apply common bioinformatics software and techniques for:

DNA Sequence Assembly
Population Genetic Analysis
Phylogenetic Analysis

--Interpret genetic information from the current literature and present/evaluate this data, especially with regards to environmental health science issues.

--Analyze the use of genetic tools in research applications. Students will know which technologies are used in which cases, and why.

Course Requirements for Grading Purposes

There is a mandatory solutions test (Quiz #1) that you must pass (80% correct) to pass the class. Students will be given 3 chances to pass the solutions test. Grades will be assigned according to: 60% quizzes (short answer), 10% class participation (after the first class absence [excused or not], 50% of this grade is lost per unexcused absence), 10% proposal, 10% paper, 10% final exam. The final exam is cumulative. Students who are happy with their course average prior to the final exam may elect to not take the final by notifying the instructor by the last day of class.

Additional requirements for graduate students (6710): Graduate students will be required to give two 10 minute presentations that each detail a recently published genetic application relevant to the course materials, and a two page report (double spaced; 1" margins; 11 or 12 pt. font) discussing the data, conclusions, and future direction of the technology.

Grading Policy

Grades will be assigned on a normalized 90% = A-, 80% = B-, 70%= C-, 60%= D- scale. Modifications to the grading policy and/or dates of quizzes, projects, etc. will be discussed in class & confirmed by an e-mail announcement.

Make-Up Policy

Examinations may be made up through prior arrangement with the instructor or, in the case of unforeseen circumstances (e.g., medical emergencies), through arrangement with the instructor on the first business day following the emergency (an e-mail at the student's first reasonable opportunity to communicate the emergency is expected).

Attendance Policy

See the class participation portion of the Course Requirements for Grading Purposes (above).

Students with Disabilities

Students with disabilities who require reasonable accommodations to participate in course activities or meet course requirements should contact the instructor.

Topical Outline

Date	Topic	Notes
8/19	Common Calculations for Lab Use	No lab
8/21	DNA Structure, Solution Making Review, μ pipettes	Last day for drop/add w/o W grade
8/26	DNA isolation	
8/28	Agarose minigels & Web of Science	Quiz 1 - solutions
9/2	Restriction Enzymes & Ligation	
9/4	Hybridization Capture	
9/9	Polymerase Chain Reaction (PCR)	
9/11	2 nd Enrichment & PCR	
9/16	TA Vector Ligation & Bacterial Transformation	
9/18	Bacterial Colony Characterization & Manipulation	Quiz 2
9/23	Colony PCR	
9/25	Fluorescent Sanger Sequencing	
9/30	Sanger Sequencing #2 – sample clean-up	
10/2	Sequence Editing and Assembly	
10/7	Microsatellite DNA Loci & Primer Design	
10/9	Microsat Amplification – within & among species	Paper is Due
10/14	Microsatellite Genotyping I	Quiz 3
10/16	Microsatellite Genotyping II	
10/21	Marker Choice & Individual Identification	
10/23	Parentage Analysis	
10/28	Population Genetics	
10/30	Sequence Alignments	
11/4	Phylogenetics	
11/6	Massively Parallel DNA Sequencing Technology	Proposal is Due
11/11	Southern, Slot, and Dot Blots	
11/13	Macroarrays and Bacterial Artificial Chromosomes	
11/18	Microarrays	
11/20	Mutation Assays or Flow Cytometry	Quiz 5
11/25	Thanksgiving Break	
11/27	THANKSGIVING	
12/2	Quantitative PCR	
12/4	Forensics & Ancient DNA	Quiz 6
12/9	Class evaluation, clean-up, review for final, etc.	Return all grades (except final)
12/11	Final Exam – 3:30 pm	Not required

General Disclaimers

The course syllabus is a general plan for the course; deviations are likely and will always be announced to the class by the instructor.

University Honor Code, Academic Honesty, and Safety Policies

All academic work must meet the standards contained in “A Culture of Honesty.” All students are responsible to inform themselves about those standards before performing any academic work. Please see: <http://www.uga.edu/honesty/index.html>

Collaboration is encouraged during most of the class, but, individual assignments, quizzes, tests, etc. should represent each student’s own work. In particular, any text appearing in any assignment that is not originally composed by the student for this class must be cited appropriately. Additionally, all university policies regarding lab safety are to be followed; students endangering the safety anyone will be dismissed from class.