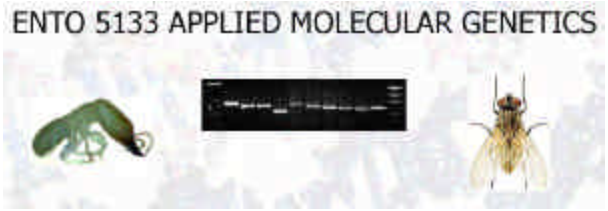


Applied Molecular Genetics

Course: ENTO 5133 – Spring 2006

Instructor: Dr. Allen L. Szalanski (aszalan@uark.edu)
Lecture: Tues/Thur 8:30 - 9:20 AM AGRI
Lab: Tues/Thur 9:30 – 10:20 AM AGRI 302
Office Hours: by arrangement
Textbooks:

PCR by M.J. McPherson, and S.G. Moller. Springer-Verlag, NY, NY. 2000. ISBN 1859960170

Phylogenetic Trees Made Easy: A How-To Manual, Second Edition (with CD-Rom) by Barry G. Hall. 2004 Sinaurer. ISBN 0878933123

Website: http://webct.uark.edu/

Course Description:

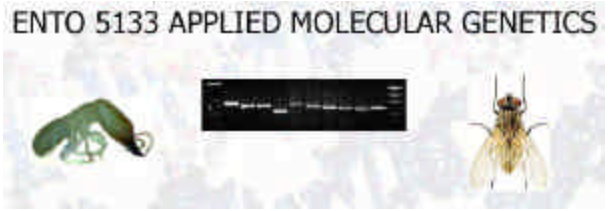
Principles of contemporary molecular genetic methods. Emphasis is on basic concepts, experimental design, and research strategies used in biological research. This is a 3 credit discussion/laboratory course designed for students interested in a practical background in genetics. Students will learn how to apply advanced molecular genetic methodologies and Internet database resources to research problems. Students are encouraged to apply these molecular methods to the organism that they are using for their graduate research.

Prerequisites: Enrollment as a graduate student and ANSC 3123 or equivalent.

Academic Honesty: All students will be given and are expected to read and strictly follow the university's policy on academic honesty.

Attendance: Class attendance is expected, however reasonable absence will be tolerated.

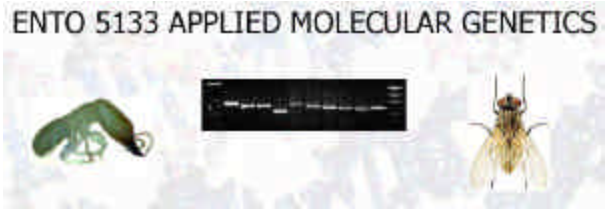
Students with Disabilities: If you want to request reasonable accommodations for this class due to a disability, you must first register with the Center for Students with Disabilities (CSD) and hand-deliver an official Accommodation Letter from the CSD to me during my office hours or after class.



Lecture and Laboratory Schedule

Revised 10-26-05

Date	#	Lecture	Reading	Laboratory
Jan 17	1	Course intro		Lab overview
Jan 19	2	Basics of Molecular Genetics	Handouts	DNA extraction
Jan 24	3	Collection and storage of samples	Handouts	DNA extraction
Jan 26	4	DNA extraction techniques	Handouts	DNA extraction
Jan 31	5	Polymerase Chain Reaction (PCR)	PCR 1&2	PCR rDNA
Feb 2	6	PCR Reagents and Instruments	PCR 3	PCR rDNA check gel
Feb 7	7	PCR optimization and primer design	PCR 4	PCR mtDNA
Feb 9	8	RAPD-PCR, PCR-AFLP, SSCP	PCR 5 & 10	PCR mtDNA check gel
Feb 14	9	DNA sequencing	Handouts	DNA purification
Feb 16	10	PCR-RFLP, Microsatellites	Handouts	Purification check gel
Feb 21		Test 1		No Lab
Feb 23	11	Molecular Diagnostics	Handouts	PCR-RFLP mtDNA
Feb 28	12	Molecular Diagnostics	Handouts	PCR-RFLP mtDNA
Mar 2		No Class ESA meeting		No Lab
Mar 7	13	Molecular Forensics	Handouts	Assignment 1 bacteria ID
Mar 9	14	Allozymes	Handouts	Assignment 1 bacteria ID
Mar 14	15	Blast and GenBank	Handouts	Assign 2 Forensic PCR
Mar 16	16	Bio-Edit software	Handouts	Assign 2 Forensic PCR
Mar 21		No class, Spring Break		
Mar 24		No class, Spring Break		
Mar 28		Test 2		
Mar 30	17	Webcutter Software	Handouts	Assignment 3 PCR-RFLP
Apr 4	18	Phylogenetic Analysis	Handouts	Assignment 3 PCR-RFLP
Apr 6	19	PAUP software	Handouts	Assignment 3 PCR-RFLP
Apr 11	20	PAUP software	Handouts	Individual Lab Project
Apr 13	21	Population Genetics	Handouts	Individual Lab Project
Apr 18		AMOVA and DNAsp software	Handouts	Individual Lab Project
Apr 20		Individual Lab Project		Individual Lab Project
Apr 25	22	Setting up a genetics lab	Handouts	Individual Lab Project
Apr 27		Research Presentations		Research Presentations
May 2		Research Presentations		Research Presentations
May 4		Final Exam		



Evaluation of student performance:

Lab Assignments (99 pts.)

Laboratory exercises are designed to give students familiarity with a variety of techniques used for genetic investigations. They also are an opportunity for students to gain skill in scientific writing. Reports based on laboratory exercises will be prepared.

In-class Exams (300 pts.) Two term exams and final exam

(NOTE: With the exception of the Final Exam date, these are tentative, and may be changed if necessary).

Individual Lab Project, Manuscript, and Presentation (101 pts.) Due May 2, 2 pm

The individual lab project, manuscript, and presentation will account for 100 pts of the grade. The manuscript will be 10-20 pages in length, double spaced, and formatted for a specific scientific journal. Information on ESA journals is available at: http://www.entsoc.org/pubs/index.html. The project can be of any biological area of research but must contain the use of molecular genetic techniques. Students are encouraged to use the organism that they are using for their graduate research.

The manuscript will contain the following:

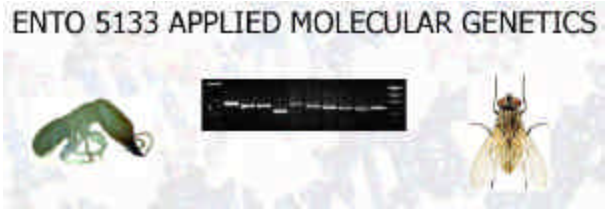
Introduction: No more than 4 pages A brief discussion of the state of the research in the field. The important part of this portion of the manuscript is that you have an understanding of the field.

Objective: No more than one to two paragraphs. A brief outline of the aims of the research. Very important to plan this out since the rest of the paper will be used to show how the proposed research will answer these specific aims.

Materials and Methods, Results and Discussion: No more than 10 pages. Remember to stay within your specific aims.

References: All articles used should be referenced according to the format specified by the journal.

This manuscript is done to allow the student to do an in depth study a subject area that is of the student's interest. By doing this, the student should acquire an understanding of how molecular genetics can impact their field of interest. The lab project/manuscript will be graded based on both written (100 pts) and a 25



minute defense (20 minute presentation and 5 minutes of questions) of the proposal in class (50 pts).

Final Course Grade

The course grade will be based on a percentage of total points, with allowance for adjusted scores depending on overall student performance with regard to the in-class exams. Percentages for assigning grades will be 100-90% = A, 89-86% = B+, 85-80% = B, 79-76 = C+, 75-70 = C, 69-50% = D, <50% = F.