

Applied Molecular Genetics

Course: BIOC 471a/571a - Fall 2001
Instructor: Dr. Roger Miesfeld (RLM@u.arizona.edu)
Information: Fall semester, 3 units, Tue/Thr, 12:30-1:45 pm, BSW 210
Prerequisites: Any of; BIOC 461, BIOC 462a, MCB 411, or instructor permission.
Objectives: Understand core concepts, design experiments, interpret molecular genetic data.
Textbook: *Applied Molecular Genetics*, R. Miesfeld, Wiley Publishing, New York, 1st Ed., 1999.
Website: www.biochem.arizona.edu/classes/bioc471

(Revised 8/24/01)

Lec.	Date	Reading	Discussion Topic
1	Aug 21	pp. 3-10	Overview of Applied Molecular Genetics
2	Aug 23	pp. 12-22	DNA metabolizing enzymes; Biochemical methods <i>Homework 1</i>
3	Aug 28	pp. 22-27	Nucleic Acids Lab Practicums
4	Aug 30	pp. 31-42	<i>E. coli</i> K12 bacterial host; Plasmid biology <i>Homework 2</i>
5	Sep 4	pp. 42-55	DNA transformation; Bacteriophage vectors
6	Sep 6	pp. 59-78	Overview of DNA libraries; In vitro mutagenesis <i>Homework 3</i>
7	Sep 11	pp. 83-96	Overview of Genomics; Genomic mapping
8	Sep 13	pp. 96-111	Genome Mapping Lab Practicums <i>Homework 4</i>
9	Sep 18	pp. 115-127	Biochemistry of cDNA synthesis; Representative cDNA libraries
10	Sep 20	pp. 128-134	Functional cDNA libraries; Using cDNA as a reagent <i>Homework 5</i>
11	Sep 25	pp. 134-138	cDNA Cloning Lab Practicums
-	Sep 27	-	471 & 571 Mid-term Exam (in class)
12	Oct 2	pp. 143-151	Biochemistry of the polymerase chain reaction (PCR)
13	Oct 4	pp. 151-158	Reverse Transcriptase-Mediated PCR <i>Homework 6</i>
14	Oct 9	pp. 159-169	PCR Applications Lab Practicums
15	Oct 11	pp. 175-191	Gene expression in cultured cells Instructions for Class Presentations
16	Oct 16	pp. 191-195	Yeast as a model; Protein expression in cultured cells
17	Oct 18	pp. 195-200	Gene Expression Lab Practicums <i>Homework 7</i>
18	Oct 23	pp. 205-212	Transgenic flies and crop plants
19	Oct 25	pp. 214-229	Mouse transgenesis; Transgenic livestock <i>Homework 8</i>
20	Oct 30	pp. 229-231	Transgenic Organisms Lab Practicums
21	Nov 1	pp. 238-241	Microarray Technology
22	Nov 6	<i>handout</i>	Computer Lab - Web Site Basics (meet in BSW 243)
23	Nov 8	pp. 239-250	Bioinformatics and Proteomics <i>Homework 9</i>

Lec.	Date	Reading	Discussion Topic
24	Nov 13	pp. 250-253	DNA Forensics and Pharmacogenetics
25	Nov 15	pp. 253-258	Gene Therapy and Stem Cell Biology <i>Homework 10</i>
26	Nov 20	pp. 258-262	Medical Molecular Genetics Lab Practicum
-	Nov 22	-	<i>Thanksgiving Day Holiday</i>
-	Nov 27	-	Class Presentations
-	Nov 29	-	Class Presentations
-	Dec 4	-	471a & 571a Final Exam (in class)
-	Dec 13	-	Deadline for Written Lab Practicum (<i>Bioc 571a students only</i>) Turn them into Dr. Miesfeld in BioScience West room 518a

Evaluation of student performance:

Students are challenged to use effective writing and oral communication skills to demonstrate competence in applied molecular genetic concepts.

Homework (100 pts.)

There will be 10 homework assignments consisting of 3-5 short answer questions. These take-home quizzes are given out at the end of class on Thursdays and written answers are due at the beginning of class the following Tuesday. Each homework assignment is worth 10 points. Group study on homework assignments is encouraged, however, each student must write their own answers and be able to explain their answer in class if called upon.

In-class Exams (200 pts.)

There will be two in-class exams (Midterm and Final) which count for 100 points each. The Midterm exam (Sept. 27) covers material in lectures 1-10, and the Final exam (Dec. 6) covers material from Lectures 11-26 and student-generated questions from the Class Presentations. Bioc 471a and Bioc 571a students take separate exams to reflect graduate course credit.

Class Presentation (100 pts.)

Each student is required to participate in a group project consisting of an original Lab Practicum that is presented in class using WWW-based media. Each group of 2-3 students is responsible for 1) generating and posting a group web site using templates provided, 2) presenting the Lab Practicum in class using the web site materials, and 3) writing three study questions for the Final Exam using material discussed in their lab practicum. All group members will receive the same score for the project which is based on peer evaluations of the presentation and instructor evaluation of the study questions.

Graduate Level Assignment (100 pts - Bioc 571a students only)

Bioc 571a students are also required to write an original independent lab practicum with study questions. This written assignment is 2-3 pages long and due on or before Dec. 13. Information regarding this Bioc 571a written assignment can be obtained from the course web site at: <http://www.biochem.arizona.edu/classes/bioc471/pages/Info-571assgn.html>.

Final Course Grade

The course grade will be based on percentage of total points (400 pts. for Bioc 471a students, 500 pts for Bioc 571a students), with allowance for adjusted scores depending on overall student performance with regard to the in-class exams. Conventional percentages for assigning grades will tentatively be; 100-90% = A, 89-80% = B, 79-70% = C, 69-50% = D, <50% = E.