

Methods in Biotechnology: Molecular Cloning

Fall 2006

3 semester credits

Class numbers	Index numbers
Biol 5260	10727
ADVS 5260	10209
PSB 5260	15761
Chem 5260	11391
NFS 5260	15226

A. Instructor:

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B. Laboratory Schedule

<u>Period</u>	<u>Date</u>	<u>Lecture subject</u>	<u>Lab</u>
#1	8/29	Introduction, orientation	
#2	8/31	Biochem lecture and sample math problems	
#3	9/5	Restriction enzyme digestion lecture	
#4	9/7	Finish RE lecture, typical reaction, math	Restriction enzyme lab
#5	9/12	CIP, cloning, plasmid, phenol DNA extraction	Dephosphorylation, DNA extr.
#6	9/14	Ligation, DNA quantification	Quantification and ligation
#7	9/19	Agarose gel electrophoresis	Agarose gel electrophoresis
#8	9/21	Finish ligation and agarose gel electrophoresis	Analyze gel – electroelution
#9	9/26	Isolation of DNA from agarose	DNA extraction
#10	9/28	Finish isolation of DNA from agarose	DNA extraction
#11	10/3	Bacterial transformation	Bacterial transformation
#12	10/5	Ligation rxns, other modifying enzymes, review	Inspect plates, circle colonies
#13	10/10	Test #1 (up to previous lab period)	
#14	10/12	Miniprep isolation of plasmid DNAMiniprep, turn in to sequence	
#15	10/17	Bioinformatics	Analyze minipreps, search

#15	10/17	Bioinformatics	sequences Analyze minipreps, search sequences
#16	10/19	Genomic DNA and RNA isolation	Cheek-cell DNA isolation (buccal)
#17	10/24	Polymerase Chain Reaction	Set-up and PCR
#18			PCR analysis
#19	10/26	Quantitative PCR (qRT-PCR)	Isolation of RNA
#20	10/31	qRT-PCR, Review test	qRT-PCR
#21			qRT-PCR analysis
#22	11/2	Test #2 (Miniprep to PCR)	
#23	11/7	RNA electrophoresis, Dideoxy DNA seq.	Denaturing RNA gel
#24	11/9	Dideoxy DNA sequencing cont.	Biotechniques case
#25	11/14	Dideoxy DNA seq. Finish,	Presentations
#26	11/16	Southern blot hybridization	gels
#26	11/16	Southern blot hybridization	Blot
#26	11/16	Southern blot hybridization	probe
#27	11/21	Biotechniques case studies cont.	
#27	11/21	Biotechniques case studies cont.	
	11/30	Open	
#32	12/7	Review	

Final Exam – Comprehensive – Thursday, 12/12/05, 11:30 am – 1:20 pm

C. Text:

New England Biolabs Catalog – you will be given this when you come to class.

You will receive a copy of the protocols when you come to class.

D. Additional References not Required:

1. F. M. Ausubel, R. Brent, R. E. Kingston, D. D. Moore, J. G. Seidman, J. A. Smith, and K. Struhl (eds.), 1987. Current Protocols in Molecular Biology. John Wiley & Sons, New York.
2. Sambrook, J., E. F. Fritsch, and T. Maniatis. 1989. Recovery and purification of DNA fractionated on agarose gels, p. 6.22-6.35. In C. Nolan (ed.), Molecular Cloning: A Laboratory Manual. Cold Spring Harbor Laboratories Press, Cold Spring Harbor.

E. Videos:

All of the procedures in the course have been documented on videotape. Videos will be used in conjunction with the lectures. These videos are located in the Biotechnology Office. Videos will be available for students who miss a lecture or who want to view the videos another time. The videos will not be allowed out of the building.

F. Grading Criteria:

- A. Case studies (5%)
- B. Math exercises and making solutions (5%)
- C. Lab questions/reports/BioTechniques Journal (5%)
- D. Tests (2 tests at 27.5% each for a total of 55%)
- E. Final exam (30%)

The letter grades are based on the percentage of total points as follows. Grading scale may be adjusted by using a curve.

<u>Percentage of Total Points Earned</u>	<u>Grade</u>
93-100	A
90-92	A-
86-89	B+
83-85	B
80-82	B-
76-79	C+
73-75	C
70-72	C-
66-69	D+
60-65	D
Less than 60	F

G. Course Goals:

- A. To learn basic methods in recombinant DNA techniques.
- B. To apply these techniques to solving experimental problems.
- C. The student should have enough experience with these techniques to get an entry-level job in a molecular biology laboratory.

H. Student's Responsibilities:

The student is expected to attend all lectures and laboratories, and do the work necessary to achieve a cumulative score greater than 80% as defined by grading criteria. Students having problems understanding the class or doing poorly on the first test should talk to the instructor about improving their grades or dropping the class. Students will also be responsible for doing case studies, math problems, lab questions and a lab report.

I. Instructor's Responsibilities:

The instructor is expected to prepare and attend all lectures, prepare examinations which are fair and representative of the material covered, and attend laboratory exercises as needed to assist students and the TA. The instructor will also be available to answer specific student questions and provide needed assistance.

J. Academic Honesty:

The University expects the students and faculty to maintain the highest standards of academic honesty. The *Student Policy Handbook*, Article V, Section 2, Paragraph A described the policy with regard to academic honesty.

K. Students with Disabilities:

We are committed to assisting students with disabilities. Please discuss your needs with the instructor.