

BIOLOGY 324 METHODS IN MOLECULAR BIOLOGY

Winter 2008

Instructor: Craig Moyer
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Office Hours: Moyer: **T, R** Noon-1:00pm; and by appt., BI 406
Graduate TAs: Justin Craig

Class Meetings: Lecture: T, 9:00-10:00am, BI 151
Laboratory: T, 2:00-5:00pm, BI 463 &
R, 2:00-5:00pm, BI 463

Reading Assignments & Information:

Note: Updated syllabus, reading assignments & general class info to be posted on the class web site:

<http://fire.biol.wvu.edu/cmoyer/cmoyer.courses.html>

Tentative Class Schedule: Revised 02/05/08

Week 1 Overview, Organizational, Safety & Lab Notebooks
(T, Jan. 08: Dr. Moyer Lecture)

T & R Labs: Pipetman test; Restriction Digestion of Plasmid DNA & Gel Electrophoresis

Week 2 DNA Manipulative Enzymes, Gel Electrophoresis, Plasmids
(T., Jan 15: Dr. Moyer Lecture)

T & R Labs: Plasmid Minipreps & DNA quantification

Week 3 Polymerase Chain Reaction: Theory and Practice
(T., Jan. 22: Dr. Moyer Lecture)

T & R Labs: Standard PCR using Plasmid Template
(T Quiz #1)

Week 4 Overview of gDNA Isolation Techniques
(T., Jan. 29: Allen Rassa, Guest Lecture)

T & R Labs: Isolation & Purification of gDNA, then gDNA Quantification

Week 5 Polymerase Chain Reaction: Applications and Expectations
(T., Feb. 05: Dr. Dalal Lecture)

T & R Labs: Gene Specific Amplification from gDNA Template & Gel electrophoresis
(R Quiz #2)

Week 6 TA Cloning, Ligation Reactions & Transformation: Overview
(T., Feb. 12: Dr. Dalal Lecture)

T & R Labs: Transformation and Screening of Clones with α -Complementation
(Follow-up: Each student picks three putative positive clones)

Week 7 Never Clone Alone: The Finer Points of Cloning & Applications
(T., Feb. 19: Dr. Dalal Lecture)

T & R Labs: Screening Putative Positive Clones with PCR & Gel electrophoresis

Week 8 Cycle Sequencing: Then and Now
(T., Feb. 26: Dr. Dalal Lecture)

T & R Labs: Plasmid MiniPreps Revisited and Preparation for Sequencing Reactions
(R Quiz #3)

Week 09 DNA Sequence Analysis with GenBank & Review
(T., Mar. 04: Dr. Moyer Lecture)

T & R Labs: Exercise using BLAST Search

Week 10 Dead Week; Take Home Final Handed Out (Due Friday by 5:00pm)
(T., Mar. 11: P/U Take Home Final)

Lab Notebook: For each individual laboratory exercise, your notebook should have all relevant details about how an experiment was conducted, such that your notebook could be used by a stranger to accurately replicate your experiment in the future. This information should include an experiment title and date, some background/introduction explaining what your experiment is and what you hope to achieve, any hypotheses and/or predictions, a protocol, the experimental results, and your interpretation and conclusions regarding your results. Please write on the right-facing pages only and reserve the left-facing pages for doing calculations, etc. Before you come to lab, please fill out your notebook for the upcoming exercise through and including the experimental protocol. Check off tasks in the protocol as you complete them. You can fill in the remainder as you work, and complete it fully before the following lab. Notebooks will be checked periodically by the instructors and/or teaching assistant, and graded for completion, organization and relevant information.

Course Evaluation and Grading:

Laboratory Notebook (Examined periodically throughout the quarter)	100 points
Brownie Points (Good Lab Citizenship)	25 points
3 Quizzes @ 25 points each	75 points
<u>Take Home Final</u>	<u>100 points</u>
Total points possible:	300 points

Course Expectations:

You will be expected to keep a well organized and clearly written laboratory notebook. This primary concept you should concern yourself with is that with your notebook you or another equally competent scientist could come back and replicate your experiment at a later date. This will be especially important when (not if, but when) your experiment does not work out right as troubleshooting is made much easier. See class introduction and handouts for further details regarding notebook and grading.

Course Objectives:

The primary goal of this course is the exposure to modern molecular biological techniques as tools for inquiry-based experimentation in a working laboratory setting. You will have to think-on-your-feet as well as effectively prepare ahead of time to undertake several different experiments. The outcome will be to provide you with the tools necessary to perform your own independent research projects using molecular biological methods in any laboratory setting and to have gained the confidence and experience to succeed.

Attendance:

This is an intensive laboratory course; progress requires your attendance, participation, and attention. If you absolutely cannot make it to a meeting, please inform the instructors ahead of time and make alternative plans for completing your work. Some weeks you will need to come in outside of the scheduled lab period to complete your experiments. You will need to share such responsibilities in an equitable manner with your lab partner. No more than one excused absence will be allowed, more than that will result in an incomplete for the course.

Rules for Good Laboratory Citizenship:

1. **Act safely.** Research labs have toxic chemicals. Never bring food and drink into a lab. Whenever you are handling potentially dangerous substances, be sure to wear gloves (in the lab only). Avoid wearing open-toed footwear. If dangerous substances and equipment will be used during the lab, we will mention these. Be sure to pay attention.
2. **Do not distract others** from doing their experiments.
3. **Come prepared** - carefully read the lab protocols and supporting information in advance.
4. **Focus upon your experiment.** Many experiments do not work because the investigator was paying more attention to a conversation than to their experiment.
5. **Keep a neat workspace,** clean up after yourself, and respect your fellow students.