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BIOL 325-01, Molecular Biology, Spring 2011

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Molecular Biology

A Lecture and Lab Course

Molecular Biology, Spring 2011

Rhodes College

Prof. Gary J. Lindquester

About the Course

Lecture Schedule

Laboratory Schedule

About the Instructor

Rhodes College

Phone: x3564

Email: gindquester@rhodes.edu

Office: FJ 108 W

Office Hours: Specific office hours may be posted on my door. However, students are free to drop in at most times and may call or email for an appointment.

SYLLABUS

General Information

This course focuses on the structure and function of genes at the molecular level. Topics include the synthesis of nucleic acids and proteins and the mechanisms of gene expression and control in prokaryotes and eukaryotes. An emphasis is placed on the design, analysis, and interpretation of classic and contemporary experiments.

The Lecture and Laboratory Schedules link to lecture notes and laboratory exercises.

Course Goals

- Understand the role of reductionism in biological inquiry.
- Understand what modern molecular biology encompasses and distinguishes it from other fields of study.
- Understand the mechanisms of information storage, utilization and transfer in prokaryotic and eukaryotic cells. Specific topics include DNA and protein structure and function, transcription, translation, replication, DNA repair and recombination/transposition.
- Understand some of the mechanisms regulating these processes.
- Understand how these processes were elucidated by experimentation.
- Learn and practice basic laboratory techniques applied to molecular biological research.
- Learn practical and theoretical aspects of more complex techniques.
- Become familiar with various applications of these techniques to solve experimental problems.
- Gain experience in reading primary and secondary scientific literature.

- Explore ways in which technical and theoretical advances in molecular biology apply to economic, political, agricultural, medical and sociological issues.

Grading and Conduct

- The grade for Biology 325 will be calculated in the following way:
 - 0.25 times the Final Exam score (approximately 50% cumulative and 50% on the material presented since the previous test).
 - 0.50 times the average of the highest 2 regular test scores (from Tests I-III).
 - 0.25 times the average of the lowest exam score and the quiz on review material.
- The grade for Biology 325L will be determined as stated on the [Lab Schedule](#) page.

Exams

Exams will consist of multiple choice, fill-in-the-blank, short answer, matching, and/or essay questions. A portion of the exams (e.g. an essay question) may be given as a take-home exercise. Students will be expected to know, understand and apply the mechanisms, processes and techniques presented in class. No exams may be taken beyond the scheduled time unless medical or personal emergency warrants it. In such cases, the professor must be consulted for approval prior to the exam time or as soon after as possible, and the professor may allow a re-exam or may average final grades without the exam, at his discretion. Generally, students may obtain permission from the professor to take an exam prior to the regular exam time if they know they will be absent on an exam day. Missed exams for reasons deemed not excusable by the professor will receive a grade of 0.

You may not consult quizzes, worksheets, exams, or other student work from previous years.

Electronic sources of information (notes, study guides and PowerPoint presentations), are provided as supplements to your textbook readings and note-taking. Technical difficulty in accessing such supplements will not be accepted as an excuse for missing or delaying an exam. You should always anticipate such difficulties and obtain electronic copies or hard copies well in advance of each exam.

Additional Assignments

Additional work in the form of problems, worksheets, literature readings and summaries, short presentations, critical thought questions, small group projects, etc. may be assigned throughout the semester. While the syllabus does not contain a provision for grading such assignments, questions related to them may appear on exams and successful completion of them will figure favorably in consideration of borderline final grades.

Attendance

Attendance in laboratories is mandatory. Unexcused absence from a scheduled lab and/or untimely completion of an assignment will result in a grade of 0 being added to the laboratory assignments. Attendance in class is expected. In a small class, your participation is critical and your absence easily noted. If you must

miss class, please notify the professor prior to your absence. Students with spotty attendance will receive no consideration for borderline grades. Students with excessive absences will be so notified and may be asked to withdraw from the course, as per the Rhodes College Catalogue.

Class Preparation

Students should read the assigned reading in the text and review any notes and study questions on the web site before each class. These readings and questions will serve as the basis for class discussion and lecture.

Grading Scale

Final grades will be determined strictly according to the following scale after rounding to the tenths place. On rare occasions, the professor may increase a borderline grade resulting from a single poor performance that is well below a student's typical work.

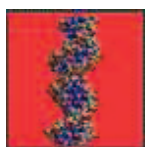
A	93-100	C	73-76.9
A-	90-92.9	C-	70-72.9
B+	87-89.9	D+	67-69.9
B	83-86.9	D	63-66.9
B-	80-82.9	D-	60-62.9
C+	77-79.9	F	0-59.9

Honor Code

Conduct in this course must adhere to the [Rhodes College Honor Code](#). This system is critical to maintaining the Rhodes Community. As such, we must all be diligent in our responsibilities under this system.

[About the Course](#) | [Lecture Schedule](#) | [Lab Schedule](#)
[About the Professor](#) | [Rhodes College](#)

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Rhodes College

M,W,F 10:00-10:50

FJ-B

SCHEDULE

DATE	TOPIC	READING*
Self-paced	Review Material	
	- <u>DNA as the Genetic Material</u>	2
	- Nature of Chemical Bonds	3, 4
	- <u>Protein Structure</u>	5
12 Jan	What is Molecular Biology?	Preface, Table of Cont.
14,19	<u>Structure of DNA and RNA</u>	6
	Unit I: Prokaryotic Gene Structure and Expression	
21,24	Transcription in Prokaryotes	12 (pp372-396)
26,28,31	Gene Structure and Regulation of Expression in Prokaryotes	16 (pp542-563)
26 Jan	Quiz on Review Material Due	
2 Feb, 4	Lambda Bacteriophage	16 (pp568-583)
7	<u>Guide to Reading Primary Lit.</u>	Lac Repressor Paper
9 Feb (Wed)	Test I (<u>study guide</u>)	
.		
	Unit II: Studying Genes and Genomes	
11,14,16,18,21	Methods and techniques	21 (pp734-750, 775-780)
23,25,28	Eukaryotic DNA Content; Genome Structure; Gene Families	7 (pp135-144) 11 (pp334-340) 13 (pp446-448)
2 Mar (Wed)	Test II (<u>study guide</u>)	
.		
	Unit III: Eukaryotic Gene Structure and Expression	
4,7,9 Mar	Chromatin Structure, Active vs. Inactive Chromatin	7 (pp156-191)
11,21,23,25	Eukaryotic Polymerases, Promoters, Transcription; Structure and Function of Transcription Factors;	12 (pp396-412) 13 (pp415-432, 452-453) 17 (pp589-606, 613-629)

28,30	RNA Processing One Gene:One Enzyme?	13 (pp432-436, 439-441, 448-451)
1 Apr (Fri)	Test III (<u>study guide</u>)	
.		
	Unit IV: Translation, Replication, Repair	
4,6,8	Translation into Protein	14 (pp457-502, 514-519) 15 (pp521-532)
11	Regulatory RNAs	18 (pp633-657)
13,15	DNA Replication	8 (pp195-238, 244-254)
18,20	DNA Repair	9 (pp257-275)
25,27	Special Topic	TBA
	Test IV / Final Exam (<u>study guide</u>)	

Fri, May 6, 5:30-8:00 p.m.

Possible alternatives (TBA)

Tue, May 3, 8:30-11:00

a.m.

Wed, May 4, 1:00-3:30

p.m.

Fri, May 6, 8:30-11:00

p.m.

*Chapter assignments are from **Molecular Biology of the Gene**, 6th Ed., Watson, et al., Pearson/Benjamin Cummings/CSHL, 2008. Other readings may be assigned.

Note: Changes in dates, specific page assignments and other reading assignments may be posted close to lecture dates and/or announced in class.

[About the Course](#) | [Lecture Schedule](#) |

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