

MOLECULAR GENETICS

Rogers State University
Spring 2005

Course Number: BIOL4153 (Zap 2115)

Credit hours: 3 credits

Meeting Time and Location

Time: 4:00-5:15pm M and W

Location: TL118

Instructor: Dr. Jae-Ho Kim

Office: LH 103

Phone: 918-343-7714(office); 918-341-1432(home)

E-Mail: jkim@rsu.edu

Textbook: Concepts of Genetics, Klug and Cummings, 7th Ed.(2003), Prentice Hall.

References: Human Molecular Genetics, Strachan and Read, 3rd Ed.(2004), Garland Science
Molecular Biology of the Cell, Albert et.al., 4th Ed.(2002), Garland Science

COURSE DESCRIPTION

Study of transcription, translation, and replication, gene organization, regulation and expression at the molecular level for prokaryotes and eukaryotes.

Prerequisites: BIOL 1144 and BIOL 3504. A class in organic chemistry is recommended.

COURSE OBJECTIVES

1. Students will discuss the evidence supporting DNA as hereditary material.
2. Students will present replication of linear and circular chromosomes in molecular terms.
3. Students will describe and present evidence in support of the molecular structure of nucleic acids and proteins and how form follows function.
4. Students will explain and present evidence to support the central dogma in detailed molecular terms.
5. Students will discuss posttranscriptional and posttranslational processing
6. Students will contrast regulation of gene expression in Eukaryotes and Prokaryotes. Such topics as promoters, operons, transcriptional factors, alternate splicing, and enhancers should be included.
7. Students will describe mutation categories and DNA repair mechanisms.
8. Students will present the chromosome and chromatin structure and relate it to regulation of gene expression.
9. Students will design and clone a gene into a vector, describing the cloning and selection process as well as the hypothetical outcome.
10. Students will explain significant experimental techniques used in molecular biology such as Polymerase Chain Reaction, dideoxy DNA sequencing, electrophoresis, affinity chromatography, directed mutation, sedimentation and equilibrium centrifugation, and enzyme-linked immunosorbent assay.

INTEGRATION OF THIS COURSE INTO THE GOALS OF B.S. IN BIOLOGY

This course supports several of the goals. Objective 1 and 9 specifically relates to critical thinking and support goal 1. Objectives 1-3 support goal 2 that relates to organic

chemistry. Objectives 1-9 support goal 3 relating to structure, function and the genetic process in prokaryotic and eukaryotic cells. Objective 10 relates to technology and supports goal 5.

METHODS OF INSTRUCTION

This course will be taught by the traditional method of lecture/discussion. Various instructional methods will be utilized to enhance or supplement the lecture/discussion sessions.

ASSESSMENT TOOLS

1. Quiz

A quiz will be given at the end of the each chapter based on covered materials. This would carry three purposes. (1) To give a chance to the students to find the important factors of the chapter. (2) To monitor the students' understanding of the materials. (3) To prepare for the test.

2. Paper review

Students would be asked to read assigned scientific journal papers that are related to the discussion topics, and review them to the class. Detail of the review guideline will be discussed in the class. Students should hand in summary of each presented paper to get the full credit.

3. Test

Five tests are scheduled throughout the semester. Tests would cover only lectured materials. Format of the test is set with various definitions, comparisons, and short essay questions. Do not expect rescheduling of the tests except the occasions of school-approved cases. See the instructor when you have an excuse ASAP.

Exam Scores: Your grade for each exam will be announced one week after they are taken. Do not call or ask for your exam results. I am not allowed to tell you your grade over the phone.

Do not ask the instructor to grade your exam "while you wait".

Adjustments on exam scores: If errors are made in scoring exams, they must be called to my attention *within two weeks* of the time the exam was returned. Corrections will not be considered after two weeks.

GRADING POLICY

1. Components toward evaluation

4 Exams including final	60%
Paper review	20%
Quiz	20%

2. Evaluation

The letter grade will be given based on percent of possible points

100% - 90%	= A
89% - 80%	= B
79% - 70%	= C
69% - 60%	= D
59% - 0%	= F

ATTENDANCE POLICY

I believe that for the students to acquire a complete understanding of the concepts covered in their text, they must attend the lecture/discussion sessions. **After the third absence, your grade will be reduced by one letter grade.** If you know in advance that you will miss class, you need to contact me before the class meets. It is your responsibility to do necessary make up work that you missed.

SPECIFIC EXPECTATIONS

I hope that this class would be informative, memorable, and enjoyable. I do ask many things of you. Among them, the most important ones are your enthusiasm, curiosity, interest, and respect to others. If you bring these attitudes to the class, you cannot help but learn. Some tips to do well in this course:

- 1) Come to class with your enthusiasm.
- 2) Follow the criteria established by the class.
- 3) Be a verbal participant during the classes.

CELL PHONE POLICY

All cell phones are to be turned off during all lecture/discussion sessions. Consequences would be expected.

WITHDRAWAL

Do your best NOT TO DROP the class. If you have a second thought based on your performance, visit with your instructor as soon as possible. So I can be part of your help.

ROGERS STATE UNIVERSITY'S CODE OF ACADEMIC CONDUCT

The Code of Academic Conduct prohibits violations of academic integrity, including, but not limited to:

Academic Misconduct:

Students are expected to follow university policies as put forth in the institution's *Student Code of Responsibilities and Conduct*. In accordance with Title 12 of *The Student Guide*, instances of alleged academic misconduct will follow the policies and procedures as described in Title 12. As a general rule, Faculty at Rogers State University has the responsibility of enforcing the academic code. Therefore, if academic misconduct is suspected I will submit a letter of alleged academic misconduct to the Office of Student Affairs.

Non-academic Misconduct:

In order to maintain an effective learning environment, students are expected to fully comply with *The Student Code*. Disruptive behavior will not be tolerated. It is the responsibility of each student to read and become familiar with the policies of *The Student Code*.

AMERICANS WITH DISABILITIES ACT

Rogers State University is committed to providing students with disabilities equal access to educational programs and services. **Before** any educational accommodation can be provided, any student who has a disability that he or she believes will require some form of accommodation must do the following: 1) inform the professor of each class of such

need; and 2) register for services to determine eligibility for assistance with the Office of Student Affairs, located in the Student Union.

Students needing more information about Student Disability Services should contact:

Jan Smith-Clayton
Director of Student Development
Office of Student Affairs
Rogers State University
918-343-7579

DISCLAIMER

I may change the contents of the syllabus when it is needed. However, I will inform you if that is necessary.

OFFICE HOURS

Please refer to the attached faculty schedule. Although I do have a few specific hours a week that I have designated as office hours, if I'm not lecturing or teaching a lab, I am usually in my office. If you have questions about any matters including class materials, please do not hesitate to stop by my office at any time. I believe that learning is initiated from the classroom, but would be enhanced and completed by meeting the instructor personally.

TENTATIVE LECTURE OUTLINE

The following schedule presents the chapters in a sequence that we will be studying through the semester. Please understand that this is a tentative schedule.

	Chapter 9. DNA Structure and Analysis
	Chapter 10. Replication and Recombination
	Chapter 11. Chromosome Structure and DNA Sequence Organization
1st Test	January 31
	Chapter 12. Genetic Code and Transcription
	Chapter 13. Translation and Proteins
	Chapter 14. Gene Mutation, DNA Repair, and Transposable Elements
	Chapter 15. Extracellular Inheritance
2nd Test	February 28
	Chapter 16. Genetics of Bacteria and Bacteriophages
	Chapter 17. Gene Regulation in Prokaryotes
	Chapter 21. Gene Regulation in Eukaryotes
	Chapter 23. Genetics of Cancer
3rd Test	April 4
	Chapter 18. Recombinant DNA Technology
	Chapter 19. Genomics, Bioinformatics, and Proteomics
	Chapter 20. Applications and Ethics of Genetic Technology