

JOHN JAY COLLEGE OF CRIMINAL JUSTICE
The City University of New York

College Name and Address: John Jay College of Criminal Justice, 524 West 59th Street, New York, NY 10019

Course Title and Section: Syllabus for Molecular Biology 1 BIO412, fall 2012

Professor's Name: Richard Li, PhD

Office Location: NB05.66.14

Contact Hours: 1:30 – 2:30 T, W, & TH

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Course Description

BIO412 consists of lectures and laboratory experiments. BIO412 is a prerequisite for BIO413 (forensic DNA analysis). Lecture topics of BIO412 include:

- Protein structure and function
- Molecular genetic mechanisms
- Molecular genetic techniques
- Genes, genomics and chromosomes
- DNA replication
- Transcriptional control of gene regulation
- Post-transcriptional gene regulation

Learning Outcomes

Reasoning

- *Determine appropriate conclusions based on scientific evidence*
- *Critically evaluate the molecular basis of various biological processes*
- *Recognize the significance of the scientific process in understanding mol bio based problems.*
- *Apply critical thinking skills in solving problems of a scientific nature*
- *Critique scientific findings as related to molecular biological analysis*

Knowledge

- *Interpret molecular research findings as published in the popular media and primary scientific literature*
- *Describe basic concepts of Molecular Biology including macro-molecular structure and function, DNA replication, gene regulation, and biotechnology*
- *Explain the essential role of molecular biology in forensic science*

Practical skills

- *Apply their basic laboratory skills and learn advanced experimental techniques including recombinant DNA analysis, microbial cell culture, transformation, and DNA sequencing*
- *Consider the importance of Quality Assurance/Quality Control in laboratory-based research*
- *Apply experimental design and analytic skills to molecular biological problems*
- *Describe how science is used in the criminal justice system*

Communication

- *Use sound scientific reporting techniques*

Course Pre-requisites or Co-requisites

BIO315

Requirements / Course Policies

Attendance and participation: You are required to attend and participate in class. An attendance sheet will be circulated during class. It is your responsibility to sign the sheet during class. You will not be permitted to sign the attendance sheet after the class has been dismissed. More than four (4) unexcused absences are considered excessive and you will receive a grade of "F".

Texts

- Required reading: reading list will be provided in class.
- Suggested background text:
 - Lodish, H. *et al.*, *Molecular Cell Biology*, W. H. Freeman and Company
 - Krebs, J. *et al.*, (2011) *Lewin's GENES X*, Jones & Bartlett Learning
 - Cox, M. (2012) *Molecular Biology: Principles and Practice*, W. H. Freeman and Company

Grading

Your grade in the lecture portion of this course is worth 40% of your course grade and the laboratory section is worth 60% of your course grade. The lecture portion of your grade will be based upon your performance in:

- Three lecture exams (10 % each). There are no make-up exams.
- Two in-class oral presentations (5 %): reviewing of primary literature (or case studies)

Course Calendar

	DATE	TOPIC	
1	Tuesday, August 28, 2012	Introduction	Central Dogma
2	Thursday, August 30, 2012	Methods in Molecular Biology and Genetic Engineering	Recombinant DNA; Cloning
3	Tuesday, September 04, 2012		Macromolecule Blotting; Probing; Microarray
4	Thursday, September 06, 2012		Expression Vectors and Systems
5	Tuesday, September 11, 2012		Gene inactivation Techniques
6	Thursday, September 13, 2012		Electrophoresis; DNA Sequencing; PCR
7	Thursday, September 20, 2012	Macromolecule Structure and Function	Protein Structure and Function
8	Thursday, September 27, 2012		Regulating Protein Function; Proteomics
9	Tuesday, October 02, 2012	DNA Replication	Structure of Nucleic Acids
10	Thursday, October 04, 2012		DNA Replication; DNA Repair; Recombination
11	Tuesday, October 09, 2012		Viruses: Parasites of the Cellular Genetic System
12	Thursday, October 11, 2012		Review
13	Tuesday, October 16, 2012		Exam 1 (covering Lec 1 - 8)
14	Thursday, October 18, 2012	The Content of the Genome	Special Topics
15	Tuesday, October 23, 2012		Gene Structure; Noncoding DNA; Mobile DNA Elements
16	Thursday, October 25, 2012		Organelle DNAs
17	Tuesday, October 30, 2012		Genomics
18	Thursday, November 01, 2012		Structural Organization of Chromosomes
19	Tuesday, November 06, 2012	Transcription and Gene Regulation	Prokaryotic Transcription
20	Thursday, November 08, 2012		Exam 2 (covering Lec 9 - 18)
21	Tuesday, November 13, 2012		Eukaryotic Transcription
22	Thursday, November 15, 2012		Gene Regulation Mechanisms
23	Tuesday, November 20, 2012		Molecular Mechanisms of Transcription Repression and Activation
24	Tuesday, November 27, 2012	Post-Transcriptional Gene Regulation and Translation	RNA Splicing and Processing
25	Thursday, November 29, 2012		Transport of mRNA Across The Nuclear Envelope; Translation
26	Tuesday, December 04, 2012		Regulatory RNA
27	Thursday, December 06, 2012		Cytoplasmic Mechanisms of Post-transcriptional Regulation
28	Tuesday, December 11, 2012		Review
29	Thursday, December 20, 2012		Final Exam (covering Lec 19 - 27)

College Wide Policies for Undergraduate Courses (see the *Undergraduate Bulletin*, Chapter IV Academic Standards)

- A. Incomplete Grade Policy
- B. Extra Work During the Semester
- C. Americans with Disabilities Act (ADA) Policies

Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at 1233N (212-237-8144). It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor.

Source: *Reasonable Accommodations: A Faculty Guide to Teaching College Students with Disabilities*, 4th ed., City University of New York, p.3.

(http://www.jjay.cuny.edu/studentlife/Reasonable_Accommodations.pdf)

Statement of the College Policy on Plagiarism

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. (*John Jay College of Criminal Justice Undergraduate Bulletin*, <http://www.jjay.cuny.edu/academics/654.php>, see Chapter IV Academic Standards)

Lab Schedule (W, TH 10:50-1:30)

Week	Date	Lab	Report Due
1	Wednesday, August 29, 2012	1	
	Thursday, August 30, 2012	2	
2	Wednesday, September 05, 2012	3	
	Thursday, September 06, 2012	4	
3	Wednesday, September 12, 2012	5,6	
	Thursday, September 13, 2012	7A	
4	Wednesday, September 19, 2012	7B	
	Thursday, September 20, 2012	8	
5	Thursday, September 27, 2012	9	
6	Wednesday, October 03, 2012	10	
	Thursday, October 04, 2012	Rpt Prep	Report 1
7	Thursday, October 11, 2012	Rpt Prep	
8	Wednesday, October 17, 2012	Rpt Prep	Report 2
	Thursday, October 18, 2012	11	
9	Wednesday, October 24, 2012	12	
	Thursday, October 25, 2012	13	
10	Wednesday, October 31, 2012	14A	
	Thursday, November 01, 2012	14B	
11	Wednesday, November 07, 2012	15A	
	Thursday, November 08, 2012	15B	
12	Wednesday, November 14, 2012	16A	
	Thursday, November 15, 2012	16B	
13	Wednesday, November 21, 2012	16C	
14	Wednesday, November 28, 2012	16D	
	Thursday, November 29, 2012	17	
15	Wednesday, December 05, 2012	18,19	Report 3
	Thursday, December 06, 2012	20	
16	Monday, December 10, 2012		Report 4

Report 1: RFLP and Southern Blot (Labs 3-8)

Report 2: PCR (Labs 9-10)

Report 3: Site-directed mutagenesis and sequencing (Lab 11-16)

Report 4: Western Blot (Labs 17-20)