

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 2 BIO413-01 Lecture, spring 2013

Professor's Name: Richard Li PhD

Office Location: NB05.66.14

Contact Hours: 1:30 – 2:45 M & T

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Course Description

BIO413 consists of lectures and laboratory experiments in forensic DNA analysis. Lecture topics include identification and characterization of biological evidence and forensic DNA typing. Laboratory experiments include: Sample preparation; DNA extraction, quantitation and amplification, forensic DNA analysis (autosomal STR, Y-STR and mtDNA); analysis of simulated "crime scene samples."

Learning Outcomes

Reasoning

- Critically evaluate the molecular basis of various biological processes with an emphasis on forensic science, particularly DNA typing.
- Recognize the complexities and intricacies of laboratory investigations
- Recognize the significance of the scientific process in understanding mol bio based problems
- Describe the scientific basis of DNA typing and interpretation.
- Apply problem solving techniques particularly related to forensic DNA typing, interpretation of profiles, and reporting statistical significance of results.

Knowledge

- Interpret molecular research findings as published in the popular media, primary scientific and medico-legal literature
- Explain concepts of forensic molecular biology, including:
 - biological evidence collection
 - identification and characterization of biological evidence
 - DNA sample processing and typing
 - forensic application of statistics and population genetics
 - bioethics

Practical skills

- Identify the basic practices of DNA analysis including: autosomal STR and 'lineage markers' (Y-STR and mtDNA) analysis, DNA quantitation, and amplification
- Explain how science is used in the criminal justice system
- Address current issues in forensic molecular biology through written/oral reports

Communication

- Use sound scientific reporting techniques
- Critique scientific findings as related to molecular biological analysis.

Course Pre-requisites or Co-requisites

BIO315 and BIO412

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: Butler, J. (2010) Fundamentals of Forensic DNA Typing, Elsevier.

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:

- Four lecture exams (30 % total). There are no make-up exams.
- Two in-class oral presentations (10 % total): reviewing of primary literature (or case studies)

The laboratory portion of your grade will be based upon your performance in:

- Four laboratory reports (15 % each)

Lecture Calendar

	TOPICS
<i>Tuesday, January 29, 2013</i>	INTRODUCTION
<i>Thursday, January 31, 2013</i>	DNA EXTRACTION
<i>Tuesday, February 05, 2013</i>	DNA QUANTITATION
<i>Thursday, February 07, 2013</i>	DNA AMPLIFICATION BY POLYMERASE CHAIN REACTION
<i>Tuesday, February 12, 2013</i>	Lincolns' Birthday observed - College is closed
<i>Thursday, February 14, 2013</i>	DNA ELECTROPHORESIS
<i>Tuesday, February 19, 2013</i>	DETECTION METHODS
<i>Thursday, February 21, 2013</i>	AUTOSOMAL STR PROFILING
<i>Tuesday, February 26, 2013</i>	EXAM 1
<i>Thursday, February 28, 2013</i>	Y-STR PROFILING AND GENDER TYPING
<i>Tuesday, March 05, 2013</i>	MITOCHONDRIAL DNA PROFILING
<i>Thursday, March 07, 2013</i>	VARIABLE-NUMBER TANDEM REPEATS PROFILING
<i>Tuesday, March 12, 2013</i>	SINGLE-NUCLEOTIDE POLYMORPHISM PROFILING
<i>Thursday, March 14, 2013</i>	THE DNA DATABASES
<i>Tuesday, March 19, 2013</i>	EVALUATION OF THE STRENGTH OF FORENSIC DNA PROFILING RESULTS
<i>Thursday, March 21, 2013</i>	EXAM 2
<i>Thursday, April 04, 2013</i>	QUALITY ASSURANCE AND QUALITY CONTROL
<i>Tuesday, April 09, 2013</i>	CRIME SCENE INVESTIGATION OF BIOLOGICAL EVIDENCE
<i>Thursday, April 11, 2013</i>	SOURCES OF DNA EVIDENCE
<i>Tuesday, April 16, 2013</i>	SEROLOGY TECHNIQUES
<i>Thursday, April 18, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Tuesday, April 23, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Thursday, April 25, 2013</i>	EXAM 3
<i>Tuesday, April 30, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Thursday, May 02, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Tuesday, May 07, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Thursday, May 09, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Tuesday, May 14, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Thursday, May 16, 2013</i>	IDENTIFICATION AND PROFILING OF BIOLOGICAL EVIDENCE
<i>Thursday, May 23, 2013</i>	EXAM 4 (10:15 - 12:15 p.m.)

Laboratory Calendar

	TOPICS	
Monday, January 28, 2013	Introduction	
Tuesday, January 29, 2013	Sample collection	
Monday, February 04, 2013	DNA Extraction	Chelex
Tuesday, February 05, 2013	DNA Extraction	QIAamp
Monday, February 11, 2013	DNA Quantitation	qPCR
Tuesday, February 12, 2013	Lincolns' Birthday observed - College is closed	
Thursday, February 14, 2013	Autosomal STR Typing (Classes follow Tuesday schedule)	PCR
Monday, February 18, 2013	Presidents' Day - College is closed	
Tuesday, February 19, 2013	Autosomal STR Typing	Electrophoresis
Wednesday, February 20, 2013	Autosomal STR Typing (Classes follow Tuesday schedule)	Data analysis
Monday, February 25, 2013	Y-STR Typing	PCR
Tuesday, February 26, 2013	Y-STR Typing	Electrophoresis
Monday, March 04, 2013	Y-STR Typing	Data analysis
Tuesday, March 05, 2013	Single Nucleotide Polymorphism	Extraction and PCR
Monday, March 11, 2013	Single Nucleotide Polymorphism	Digestion and electrophoresis
Tuesday, March 12, 2013	Single Nucleotide Polymorphism	Electrophoresis
Monday, March 18, 2013	Mitochondrial DNA Typing	PCR
Tuesday, March 19, 2013	Mitochondrial DNA Typing	Quantitation
Monday, April 08, 2013	Mitochondrial DNA Typing	Linear array
Tuesday, April 09, 2013	Mitochondrial DNA Typing	Cycle-sequencing
Monday, April 15, 2013	Mitochondrial DNA Typing	Electrophoresis
Tuesday, April 16, 2013	Mitochondrial DNA Typing	Data analysis
Monday, April 22, 2013	Analysis of simulated "Crime Scene" samples	DNA Extraction
Tuesday, April 23, 2013	Analysis of simulated "Crime Scene" samples	Quantitation
Monday, April 29, 2013	Analysis of simulated "Crime Scene" samples	PCR
Tuesday, April 30, 2013	Analysis of simulated "Crime Scene" samples	Electrophoresis
Monday, May 06, 2013	Analysis of simulated "Crime Scene" samples	Data analysis

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)