NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

FRSC 479: Forensic Biology
Spring 2024
T: 1:00-2:55 PM TIER 209
R: 1:00-5:20 PM TIER 209
Course Syllabus

COURSE INFORMATION

Course Description: This course will cover the scientific principles behind forensic DNA analysis techniques: DNA extraction, quantification, amplification, interpretation of STR data, and the statistical analysis of DNA profiles. Students will also learn about current developments in the field, interesting historical cases involving forensic DNA, and legal challenges to new DNA technologies. The course also contains a weekly laboratory component.

Number of Credits: 4

Prerequisites: None

Course-Section	Instructor
FRSC 479-001	Sara C. Zapico
Lab R: 1:00-5:20 PM, TIER 209	Office: Tiernan Hall 365
Lecture T: 1:00-2:55 PM, TIER 209	Office Hours: By appointment through e-mail
	Ph: 973-642-4070; email: sc338@njit.edu

Required Textbook:

Title	*(1) Fundamentals of Forensic DNA Typing*
Author	John Butler
Edition	
Publisher	Academic Press
ISBN #	978-0123749994

Recommended Textbooks (If you plan on pursuing a career in Forensic Biology, you should get these):

Title	*(2) Advanced Topics in Forensic DNA Typing: Methodology*
	(3) Advanced Topics in Forensic DNA Typing: Interpretation
Author	John Butler
Publisher	Academic Press
ISBN #	978-0123745132 & 973-0124052130

and additional readings as assigned.

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, April 4, 2022. It will be strictly enforced.

Learning Outcomes: Upon completion of this course, students will:

- Identify forensic science procedures and technologies used to examine and analyze DNA evidence
- Evaluate the statistical significance of DNA results
- Communicate appropriate conclusions based on DNA results
- Apply critical thinking skills using methods of scientific inquiry through discussing recent high profile cases
- Understand how forensic biological data influences legal decisions and shapes scientific reporting requirements
- Be able to understand and explain probabilistic genotyping
- Learn about new DNA technologies, including Rapid DNA, Forensic Genealogy, and Massively Parallel Sequencing

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

NJIT Academic Integrity Code: **Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: *http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf*.**
Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Grading Policy: The final grade in this course will be determined as follows:

Class Participation	10%
Class Surveys	5%
Labs	50%
Midterm	15%
Final Exam	20%

Your final letter grade in this course will be based on the following:

A	90-100	**C**	70-76
B+	87-89	**D**	60-69
B	80-86	**F**	<60
C+	77-79		

Attendance Policy: This is a face-to-face class. The first two weeks of the semester will be online, as stipulated by NJIT. Class attendance is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes." After one unexcused absence, each subsequent absence will result in your class participation score being lowered by one percentage point. (All excused

absences need to go through the Dean of Students). You are expected to read the relevant chapters and/or reading assignments prior to the lecture and lab. Students who participate in class will receive points towards their class participation grade. Labs (on Thursdays) will be in Tiernan 209. We will be wearing PPE and practicing social distancing. Lectures (on Mondays) will be in Tiernan 209.

Exams: Exams will be "open book" and based on critical thinking. I will give you the Exams fifteen days before the deadline to complete on your own pace. Midterm and final will cover the readings and lectures.

Midterm	Due March 28, 2024
Final Exam	Final Exam Week

Makeup Exam Policy: There will normally be **NO MAKE-UP EXAMS** during the semester. In the event that a student has a legitimate reason for missing an exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed. A written assignment will be given in place of any missed exam.

Labs: *Attendance to the lab is mandatory*. Apart from performing the experiments, *students should submit a lab report per each lab*. The *deadline of the lab report will be fifteen days after the lab is completed*.

ADDITIONAL RESOURCES

Accommodation of Disabilities: Office of Accessibility Resources and Services (***formerly known as Disability Support Services***) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- https://www.njit.edu/studentsuccess/accessibility

Important Dates (See Spring 2024 Academic Calendar | Office of The Registrar (njit.edu))

Date	Event
Jan 16	First Day of Classes
Jan 22	Last day to add or drop
March 10	Spring Recess Begins
March 16	Spring Recess Ends
March 29	Good Friday-No Classes Scheduled-University Closed
April 30	Last Day of Classes
May 1-2	Reading Days
May 3-9	Final Exams

Course Outline

Lecture	Date	Topic	Assignment
Week 1	**T, Jan 16**	**No class**	**First Survey (Due Jan 23)**
	R, Jan 18	Introduction; Overview & DNA Basics; History of DNA Typing. Around the lab: Safety; Pipetting; Decontamination	1:1-3 Handout
Week 2	T, Jan 23	Serology; Body Fluid Identification	Handouts
	R, Jan 25	Body Fluid ID lab	**Lab Report 1 (Due Feb 8)**
Week 3	T, Jan 30	Sample Collection and Extraction	1:4-5
	R, Feb 1	Extraction Lab-Automate Express	**Lab Report 2 (Due Feb 15)**
Week 4	T, Feb 6	Quantification	1:6
	R, Feb 8	Quantification Lab	**Lab Report 3 (Due Feb 22)**
Week 5	T, Feb 13	Amplification & STR Markers	1: 7-8
	R, Feb 15	Amplification Lab	**Lab Report 4 (Due Feb 29)**
Week 6	T, Feb 20	**No class-AAFS meeting**	**No class**
	R, Feb 22	**No class-AAFS meeting**	**No class**
Week 7	T, Feb 27	Fundamentals of DNA Separation and Detection	1:9
	R, Feb 29	SeqStudio Lab	**Lab Report 5 (Due March 26)**
Week 8	T, March 5	STR Genotyping and Data Interpretation	1:10-11 **Midterm (Due March 28)**
	R, March 7	Genemapper IDX Lab	**Lab Report 6 (Due Apr 4)**
Week 9	T, March 12	**No class-Spring Break**	**No class**
	R, March 14	**No class-Spring Break**	**No class**
Week 10	T, March 19	Forensic Challenges	1:14
	R, March 21	Statistical Interpretation Lab	
Week 11	T, March 26	Lineage Markers: Y Chromosome and mtDNA Testing	1:16
	R, March 28	mtDNA Lab I/Reporting Forensic Findings	**Lab Report 8 (Due May 9)**
Week 12	T, Apr 2	Quality Assurance/DNA Databases	1:13
	R, Apr 4	mtDNA Lab II	**Second Survey (Due Apr 11)**
Week 12	T, Apr 9	Expert Witness Testimony	1:15
	R, Apr 11	mtDNA Lab III	**Lab Report 7 (Due Apr 25)** 1:12
Week 13	T, Apr 16	Non-human DNA	Handouts
	R, Apr 18	NYC OCME Visit	
Week 14	T, Apr 23	New Technologies	
	R, Apr 25	Practical Applications of Forensic DNA Typing	
Week 15	T, Apr 30	Review Final Exam	**Final Exam (Due May 9)**