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 2025
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 479-002	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 7, 2025. 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. 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 April 1, 2025
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 21	First Day of Classes
Jan 27	Last day to add or drop
March 16	Spring Recess Begins
March 22	Spring Recess Ends
April 3	Wellness Day
May 6	Last Day of Classes
May 8-9	Reading Days
May 16-18	Final Exams

Course Outline

Lecture	Date	Topic	Assignment
Week 1	T, Jan 21	Introduction; Overview & DNA Basics; History of DNA Typing.	1:1-3 **First Survey (Due Jan 28)**
	R, Jan 23	Around the lab: Safety; Pipetting; Decontamination	Handout
Week 2	T, Jan 28	Serology; Body Fluid Identification	Handouts
	R, Jan 30	Body Fluid ID lab	**Lab Report 1 (Due Feb 13)**
Week 3	T, Feb 4	Sample Collection and Extraction	1:4-5
	R, Feb 6	Extraction Lab-Automate Express	**Lab Report 2 (Due Feb 20)**
Week 4	T, Feb 11	Quantification	1:6
	R, Feb 13	Quantification Lab	**Lab Report 3 (Due Feb 27)**
Week 5	T, Feb 18	**AAFS meeting**	**No class**
	R, Feb 20	**AAFS meeting**	**No class**
Week 6	T, Feb 25	Amplification & STR Markers	1: 7-8
	R, Feb 27	Amplification Lab	**Lab Report 4 (Due Mar 13)**
Week 7	T, March 4	Fundamentals of DNA Separation and Detection	1:9
	R, March 6	SeqStudio Lab	**Lab Report 5 (Due March 20)**
Week 8	T, March 11	STR Genotyping and Data Interpretation	1:10-11 **Midterm (Due April 1)**
	R, March 13	Genemapper IDX Lab	**Lab Report 6 (Due March 27)**
Week 9	T, March 18	**Spring Break**	**No class**
	R, March 20	**Spring Break**	**No class**
Week 10	T, March 25	Forensic Challenges	1:14
	R, March 27	Statistical Interpretation Lab/Reporting Forensic Findings	**Lab Report 8 (Due May 1)**
Week 11	T, April 1	Lineage Markers: Y Chromosome and mtDNA Testing	1:16
	R, April 3	**Wellness Day**	**No class**
Week 12	T, Apr 8	Quality Assurance/DNA Databases	1:13
	R, Apr 10	mtDNA Lab I	**Second Survey (Due May 1)**
Week 12	T, Apr 15	Expert Witness Testimony	1:15
	R, Apr 17	mtDNA Lab II	**Final Lab Report 9 (Due May 9)**
Week 13	T, Apr 22	**No class**	**No class**
	R, Apr 24	mtDNA Lab III	**Lab Report 7 (Due May 6)**
Week 14	T, Apr 29	Non-human DNA-New Technologies	Handouts
	R, May 1	Practical Applications of Forensic DNA Typing	Handouts
Week 15	T, May 6	Review Final Exam	**Final Exam (Due May 9)**