

Spring 2022

## FRSC 479-002: Forensic Biology

Sara Zapico

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**FRSC 479: Forensic Biology**  
**Spring 2022**  
**R: 8:30-10:25 AM FMH 110**  
**F: 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 F: 1:00-5:20 PM, TIER 209	Office: Tiernan Hall 365
Lecture R: 8:30-10:20 AM, FMNH 110	Office Hours: By appointment through e-mail
	Ph: 973-642-4070; email: sc338@njit.edu

**Required Textbook:**

<b>Title</b>	(1) <i>Fundamentals of Forensic DNA Typing</i>
<b>Author</b>	John Butler
<b>Edition</b>	
<b>Publisher</b>	Academic Press
<b>ISBN #</b>	978-0123749994

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

<b>Title</b>	(2) <i>Advanced Topics in Forensic DNA Typing: Methodology</i>
	(3) <i>Advanced Topics in Forensic DNA Typing: Interpretation</i>
<b>Author</b>	John Butler
<b>Publisher</b>	Academic Press
<b>ISBN #</b>	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](http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf):** 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](mailto:dos@njit.edu).

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

<b>Class Participation</b>	10%
<b>Labs</b>	50%
<b>Midterm</b>	20%
<b>Final Exam</b>	20%

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

<b>A</b>	90-100	<b>C</b>	70-76
<b>B+</b>	87-89	<b>D</b>	60-69
<b>B</b>	80-86	<b>F</b>	<60
<b>C+</b>	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 Fridays) will be in Tiernan 209. We will be wearing PPE and practicing social distancing. Lectures (on Thursdays) will be in FMH 110.

**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 25, 2022
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](mailto: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 2022 Academic Calendar | Office of The Registrar \(njit.edu\)](#))

Date	Event
Jan 18	First Day of Classes
Jan 24	Last day to add or drop
March 14	Spring Recess Begins
March 19	Spring Recess Ends
April 15	Good Friday-No Classes Scheduled-University Closed
May 3	Last Day of Classes
May 4-5	Reading Days
May 6-12	Final Exams

## Course Outline

In red, online  
classes

Lecture	Date	Topic	Assignment
Week 1	R, Jan 20	Introduction; Overview Typing	1:1-3
	F, Jan 21	Around the lab: Safety; Pipetting; Decontamination	Handout
Week 2	R, Jan 27	DNA Basics; History of DNA Identification	1:1-3
	F, Jan 28	Virtual DNA Lab	<b>Lab Report 1 (Due Feb 11)</b>
Week 3	R, Feb 3	Serology; Body Fluid	Handouts
	F, Feb 4	Body Fluid ID lab	<b>Lab Report 2 (Due Feb 17)</b>
Week 4	R, Feb 10	Sample Collection and Extraction	1: 4-5
	F, Feb 11	Extraction Lab-Automate Express	<b>Lab Report 3 (Due Feb 25)</b>
Week 5	R, Feb 17	Quantification	1: 6
	F, Feb 18	Quantification Lab	<b>Lab Report 4 (Due March 4)</b>
Week 6	R, Feb 24	AAFS meeting-No class	Extra-credit: AAFS virtual attending
	F, Feb 25	AAFS meeting-No Lab	Extra-credit: AAFS virtual attending
Week 7	R, March 3	Amplification & STR Markers	1:7,8
	F, March 4	Amplification Lab	<b>Lab Report 5 (Due March 25)</b>
Week 8	R, March 10	Fundamentals of DNA Separation and Detection	1:9
	F, March 11	SeqStudio Lab	<b>Lab Report 6 (Due April 1)</b>
Week 9	R, March 17	Spring Break-No class	
	F, March 18	Spring Break-No class	
Week 10	R, March 24	STR Genotyping and Data Interpretation	1:10,11
	F, March 25	Genemapper IDX lab	<b>Lab Report 7 (Due April 8); Midterm</b>
Week 11	R, March 31	Forensic Challenges: Degraded DNA, Mixtures, and LCN	1:14
	F, April 1	STR Mix Lab	<b>Lab Report 8 (Due April 15)</b>
Week 12	R, April 7	Lineage Markers: Y Chromosome and mtDNA testing	1:16
	F, April 8	mtDNA Lab/Visit Medical Examiner's Office	
Week 13	R, April 14	Quality Assurance-DNA Databases	1:12-13
	F, April 15	Good Friday-No Labs	
Week 14	R, April 21	Statistical Interpretation: Evaluating the Strength of...	1:11 and Appendix
	F, April 22	Statistical Interpretation Lab	<b>Lab Report 9 (Due May 6)</b>
Week 15	R, April 28	New Technologies; Review for Final	1:18
	F, April 29	<b>Final Exam</b>	<b>Due Final's Week</b>