

BIOL3357 DNA STRUCTURE AND ANALYSIS, FALL 2024, CRN# 15536

Instructor: Dr. Hsini Lin; Email: hlin@utep.edu

Lecture Time: 9:00 – 10:20 am, MW

Location: Undergraduate Learning Center 346

Office Hours: 10:30 – 11:30, MW by appointment

Course Objective

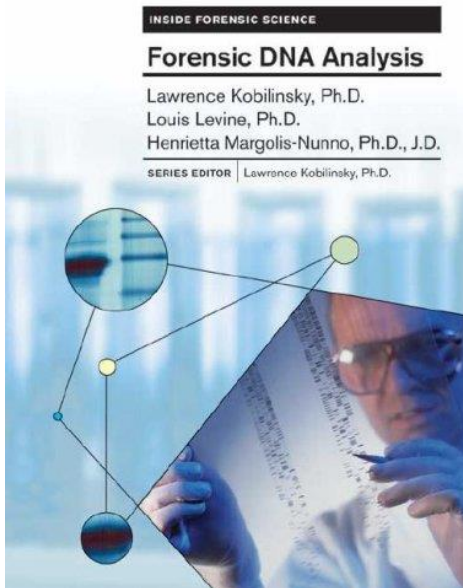
This course will provide students with a general understanding of the science of DNA analysis in criminal investigations. Students will learn the scientific principles behind DNA techniques.

Upon completion of this course, you will be able to:

- Demonstrate an understanding of the techniques used to obtain samples and proper storage of the samples.
- Demonstrate an understanding of the technique used to extract, quantitate, amplify, and separate DNA from forensic samples.

Required Materials

- A good attitude and willingness to work hard.
- Access to online course materials on Blackboard.
- An e-mail address on record that you check regularly.
- *Textbook: Forensic DNA Analysis*. Lawrence Kobilinsky, Louis Levine, Henrietta Margolis-Nunno 2010. ISBN 0791089231



Technology Requirement

Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or switch to another browser.

You will need access to a computer/laptop, a webcam, and a microphone. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and can access all parts of the course.

If you do not have word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook, and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#), as they are explicitly trained to assist with students' technological needs. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you!

Course Communication

There are several ways we can keep the communication channels open:

- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 48 hours of receipt. When emailing me, be sure to email from your UTEP student account, and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, put your first and last name and university identification number.
- **Announcements:** Check the Blackboard announcements frequently for updates, deadlines, or other important messages.
- **Discussion Board:** If you have a question that you believe other students may also have, please post it in the Help Board of the discussion boards inside of Blackboard. Please respond to other students' questions if you have a helpful response.
- **Office Hours:** If you need to meet with me, please contact me to schedule an appointment. My office hours will be held on Zoom or Blackboard Collaborate.

Course Schedule

Students are expected to complete the assigned activities associated with the Course Schedule and Blackboard topics within the scheduled timeline. If students fail to submit any required work before the deadline, they will receive a grade of zero (0) for that assignment, with no exceptions.

Course Schedule (Please Note that this schedule is subject to change)

Date		Topic	Required Reading
08/26	M	Introduction	
08/28	W	How to Identify a Criminal	Chapter 1
09/02	M	Labor Day (No Class)	
09/04	W	DNA: Sources and Structure	Chapter 2
09/09	M	DNA: Sources and Structure	Chapter 2
09/11	W	EXAM 1	
09/16	M	The Genetics Underlying Forensic DNA Typing	Chapter 3
09/18	W	Group Meeting 1	
09/23	M	The Genetics Underlying Forensic DNA Typing	Chapter 3
09/25	W	Sample Collection and Storage	
09/30	M	EXAM 2	
10/02	W	Procedures in Forensic DNA Analysis	Chapter 4
10/07	M	Procedures in Forensic DNA Analysis	Chapter 4
10/09	W	Interpretation of Autosomal STR DNA Analysis	Chapter 5
10/14	M	Interpretation of Autosomal STR DNA Analysis	Chapter 5
10/16	W	EXAM 3	
10/21	M	Mitochondrial DNA	
10/23	W	Y Chromosome	
10/28	M	Review & Catchup	
10/30	W	EXAM 4	
11/04	M	Group Meeting 2	
11/06	W	Group Meeting 3	
11/11	M	Frequency and Probability	Chapter 8
11/13	W	Frequency and Probability	Chapter 8
11/18	M	Group Presentation 1	
11/20	W	Group Presentation 2	
11/25	M	Group Presentation 3	
11/27	W	Group Presentation 4	
12/02	M	Group Presentation 5	
12/04	W	Group Presentation 6	
		EXAM 5	

Grading

The letter grading system will be used. A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = <60. I do round off. Your grade will be determined based on Attendance, Assignments, Exams, Group Project, and Quizzes.

Activity	% toward to final grade
Attendance	10%
Assignment	10%
Exam	50%
Group Project	15%
Quiz	15%

Attendance (10%): Submit an exit ticket to receive the attendance credits.

Assignments (10%): Assignments will be posted on the blackboard. Assignments should be submitted before their deadlines. I'm very strict with deadlines. 10 points per day will be deducted for a late submission. No assignments will be accepted after the closing date. So, it is your responsibility to leave enough time to deal with possible personal issues or technical difficulties that may arise during online submission

Exams (50%): There will be 5 exams during the semester. Exams are only available during the scheduled time. If you fail to complete the exam before the deadline, 10 points/day will be deducted from your grade until the exam is closed. If you fail to complete the exam before the closing date, the exam will be closed, and you will receive a grade of zero (0) for that exam. The exams are timed.

Group Project (15%): Conduct research on the selected historical crime case and present it to the class. The presentation should be 10-15 minutes, including the case summary, evidence description, legal aspects, personal analysis, and source citation. See the blackboard for more details.

- Important due dates:
 - SEP 30: Research and Case Summary
 - NOV 06: Evidence and DNA Analysis
 - DEC 04: Presentation and Peer Review

Quizzes (15%): You must take the quizzes before their deadlines. If you fail to complete the quiz before the deadline, the quiz will be closed, and you will receive a grade of zero (0) for that quiz.

Missed Examination Policy: A missed examination contributes zero percent toward the student's final course grade. Since this is an online course, exams are delivered via a database. Once an exam has closed, it will no longer be possible to retake the exam. **Do not use a wireless internet connection to complete assignments or take exams, as these**

connections can be unreliable and cause the submission of your work before you've completed the work, and nothing can be done.

Make-up work will be given *only* in the case of a *documented* emergency. Make-up work may be in a different format than the original work, require more intensive preparation, and be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. Therefore, it is important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. No further extensions or exceptions will be granted once a deadline has been established for make-up work.

Discussion Board: Discussion Board Topics allow students to strengthen their ability to communicate effectively in writing. Students should answer the question posed in the Discussion Board Topic and comment on responses made by other students. Students are expected to post contributions that are well thought out, well written, and that apply the principles of effective communication.

Responding to Posts

It's called a discussion forum because people are supposed to discuss ideas! Clever, huh? That means it will only be helpful if you respond to others, not just post your messages. You will not get the best results or grades from this kind of communication if you don't react to your classmates.

To respond to a message, simply enter the appropriate forum, then click on the subject of a message. Read the message, and if you want to respond, scroll to the bottom and click "Reply." Type your message and "Submit." Here are more hints:

- **Don't agree with everything.** "Good idea!" "I agree" or, "I think the same thing" is not worthwhile responses. They don't add to the conversation. If you agree with the poster, try to add another example or clarify the point more. It's OK to have a different opinion. On the other hand, ...
- **Don't disagree with everything.** You won't impress anyone by being critical of every posting made. Try to be generous in interpreting others. Ask clarifying questions if you are not sure you understand.
- **Search for balanced replies.** When you respond to others, try to include both positives and negatives about what they have said. Tell them what you like about their ideas or complement their intentions. Then let them know what part of their response they should consider giving more thought or looking at again.
- **Replies should be helpful.** A good reply will give everyone following along more to think about. If it is critical, the critique will be specific, clear, and point toward possible improvements. Often, asking more questions is the best sort of reply. A good reply will encourage the poster to respond again. Hopefully, they will look forward to more interactions with you in the future.
- **Attack arguments, but don't attack people.** Don't get personal in a discussion forum. At the worst, be generous and assume that it is the person's idea that you don't like, not

the person. Ad hominem attacks (against the person) will lose friends and participation points for you. So will racist, sexist, ageist, and other bigoted comments. So will profanity and obscenity. Let's stay civil!

- **If you encounter difficulties or the argument gets too hot, let your instructor know.** Your instructor will be checking the forum regularly but may miss a critical posting. If someone posts something that upsets you, talk to your instructor about it. In some cases, your instructor might help clear up misunderstandings, or if necessary, delete an offensive message from the discourse.

Inappropriate Behavior

Some behaviors are inappropriate in a discussion group. This is especially true for academic groups. Remember that your professor is reading this discussion and act accordingly. Examples of improper conduct are:

- Using abusive, disrespectful, or foul language
- Using sexually suggestive language (explicit or implicit) that could be perceived as offensive or harassing.
- Threatening others
- Insulting others or denigrating the opinions of others. It is pretty normal to disagree but do so respectfully and without personal attacks.
- Making personal attacks
 - Posting in all capital letters, it looks like you are screaming
 - Responding in anger – if you are angry, take a ten-minute break before responding
 - Posting racist or hateful comments about ethnicity, gender, intelligence, or income level
 - Be very careful if you decide to use sarcasm – it can easily be misunderstood

Absence/Drop/Incomplete Policy: It is your responsibility to complete the scheduled activities before the deadline. If you cannot complete the assigned activities due to a severe illness or a legitimate excuse, such as military personnel called to active duty or training, make arrangements with me before you leave. **Nov 1st** is the last day students may drop with an automatic "W." An "I" (incomplete grade) can only be considered only if requested by the student in advance of the conclusion of the course and only for legitimate, documented emergencies. Failure to request and negotiate the terms of an "Incomplete" grade before the conclusion of the course will result in denial except in the most extraordinary circumstances.

Academic Integrity Policy: You must submit work that you yourself have completed. Work you submit that was not directly written by you is considered cheating and will result in a 0 for the assignment. Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes but is not limited to cheating, plagiarism, and collusion. Cheating may involve copying or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as one's own. Persistent submission of work performed by someone/something else will be reported to the Office of Student Conduct for evaluation. Collusion involves collaborating with

another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#). UTEP's policies regarding academic integrity apply in this course. Information on this policy can be found at <http://academics.utep.edu/Default.aspx?tabid=23785>

Accommodation Policy: The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services, and activities with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#). The student is responsible for presenting any DSS accommodation letters and instructions to the instructor.

DNA Case Study Group Project

DNA, as evidence, has been an influential part of many real-life cases. Most forensic investigators agree that DNA is the most helpful evidence in solving crimes. Many older cases have been re-evaluated via The Innocence Project, and convictions have been overturned due to the advancements in DNA technology. Many of these cases are extremely interesting. In this project, you will research a real-life case of interest and showcase your findings during the presentation.

Task:

Research a real-life case where DNA profiling played a crucial role in solving the case (or exonerating the wrongfully accused) and create a presentation that showcases your findings. The project will be divided into three smaller assignments to help you stay on track.

Due Date:

- Assignment 1: Research and Case Summary: SEP 30
- Assignment 2: Evidence and DNA Analysis: NOV 06
- Assignment 3: Presentation and Peer Review: DEC 04

Assignment 1: Research & Case Summary

- Conduct initial research on your chosen case and provide a summary of the case. Identify key information and begin organizing your findings
- **Deliverable:** A written report (1-2 pages) covering the basic details of the case.

Assignment 2: Evidence and DNA Analysis

- Delve deeper into the evidence and the role of DNA profiling in your case. Create detailed slides focusing on the evidence and DNA's impact
- **Deliverables:** Create and submit a short quiz with 5 questions related to the evidence and DNA analysis of your case. Include the answers to the quiz in your submission. Here is an example of what the quiz would look like.

What type of DNA evidence was crucial in linking the suspect to the crime scene?

- A) Blood sample
- B) Hair follicle
- C) Saliva sample
- D) Skin cells

Answer: A) Blood sample

Assignment 3: Presentation and Peer Review

- Finalize your presentation
- **Deliverables:** Submit the final presentation and ensure it includes all required elements. Provide constructive feedback on another group's presentation, focusing on content, clarity, and creativity. Submit your feedback along with your final presentation.

Slide Quick Reference: Use the following checklist as you create your slideshow

- Slide 1: Title Slide
- Slide 2: Question Slides (see next page)
- Slide 3: Summary of Case
- Slide 4: Main Suspects
- Slide 5: Evidence From Case
- Slide 6: DNA's Influence
- Slide 7: Case Outcome
- Slide 8: Reference Slide

Slide 1: Title Slide: Your title slide must include your group number, names, the date, the name of your case and a picture.

Slide 2: Questions to Answer: Directions: After your title slide, you will include evidence of your research by answering the following questions. To receive FULL credit for this portion of the project, you must answer each question.

1. When was this crime committed?
2. Where was the crime committed?
3. Who (or what agency) investigated the case?
4. Where did the trial take place?
5. Who was/were the main suspect/suspects in this criminal investigation?
6. What evidence was presented in this case that proved vital in solving/not solving the case?
7. How was DNA profiling used in this case?
8. Did the DNA help to solve the case? Explain.
9. What was the outcome of your case?
10. What do you think the outcome would have been without the DNA evidence?

Slide 3: Summary of Case: Include a summary of your case on this slide. Please put it in bullet format

- XXXXX
- XXXXX
- XXXXX

Slide 4: Main Suspects: List any main suspects on this slide. Be sure to include pictures.

Slide 5: Evidence From Case: Using bullets, list all evidence that was used in your case. Pictures and video clips embedded in this slide will give you creativity points.

Slide 6: DNA's Influence: How did DNA impact your case? Write a short 2-3 sentence explanation. Add a graphic or image.

Slide 7: Case Outcome: In this slide, explain what happened in your case. You can choose to place a short video clip on this slide (or embed the hyperlink to a video clip)

Slide 8: Reference Slide: It is vital that you give credit to your sources. As you conduct research, copy and paste the URL into this slide.

Grading Rubric

Assignment 1: Research and Case Summary (30 Points)

Criteria	Exemplary (10-9 points)	Proficient (8-7 points)	Satisfactory (6-5 points)	Needs Improvement (4-3 points)	Unsatisfactory (2-0 points)
Case Summary (12 Points)	Comprehensive, clear, and well-organized; includes all key details.	Clear and organized with most key details included.	Generally clear but lacks detail or organization.	Unclear or disorganized with missing key details.	Incomplete or lacks coherence.
Research Depth (10 Points)	Thorough research with a deep understanding; diverse sources.	Good research with solid understanding; several sources.	Adequate research but somewhat superficial; limited sources.	Minimal research or lacks depth; few sources.	Insufficient or poorly conducted research.
Accuracy and Relevance (6 Points)	All information accurate, relevant, and well-integrated.	Most information accurate and relevant; minor inaccuracies.	Some inaccuracies or irrelevant information; not well-integrated.	Significant inaccuracies or irrelevant information; poorly integrated.	Mostly inaccurate or irrelevant information.
Writing Quality (2 Points)	Clear, concise, and error-free; follows proper formatting and style.	Mostly clear with few errors; mostly follows formatting and style.	Somewhat clear but contains errors; formatting and style inconsistent.	Unclear with frequent errors; poor formatting and style.	Unclear, numerous errors; does not follow formatting or style guidelines.

Assignment 2: Evidence and DNA Analysis (30 Points)

Criteria	Exemplary (10-9 points)	Proficient (8-7 points)	Satisfactory (6-5 points)	Needs Improvement (4-3 points)	Unsatisfactory (2-0 points)
Evidence Analysis (12 Points)	Detailed and insightful; clearly explains evidence use in the case.	Good analysis with clear explanations on evidence use.	Basic analysis; explanations unclear or lacking detail.	Superficial or unclear analysis; explanations insufficient.	Minimal or incorrect analysis; lacks explanation.
DNA Analysis (10 Points)	Thorough explanation of methods; clear impact on the case.	Good explanation of methods with clear impact.	Basic explanation; some understanding of impact unclear.	Limited explanation; poor impact explanation.	Inadequate explanation; impact not addressed.
Quiz Creation (6 Points)	Well-designed quiz; accurate and reflects deep understanding.	Well-designed quiz; relevant questions and mostly accurate answers.	Relevant questions but some inaccuracies; basic understanding.	Issues with relevance or accuracy; unclear understanding.	Poorly designed; irrelevant or inaccurate questions.
Writing Quality (2 Points)	Clear, concise, and error-free; adheres to formatting and style.	Mostly clear with minor errors; follows formatting and style.	Somewhat clear with noticeable errors; formatting inconsistent.	Unclear with frequent errors; poor formatting and style.	Unclear, numerous errors; does not follow formatting or style guidelines.

Assignment 3: Presentation and Peer Review (40 Points)

Criteria	Exemplary (10-9 points)	Proficient (8-7 points)	Satisfactory (6-5 points)	Needs Improvement (4-3 points)	Unsatisfactory (2-0 points)
Content and Accuracy (15 Points)	Thorough, accurate, and highly informative; covers all key points.	Accurate and informative with minor omissions.	Generally accurate but lacks detail or has omissions.	Significant inaccuracies or omissions; key points missing.	Inaccurate or incomplete; lacks key information.
Organization and Structure (10 Points)	Exceptionally well-organized with clear flow and smooth transitions.	Well-organized with minor flow or transition issues.	Adequate organization but with noticeable issues.	Poorly organized with significant flow or transition issues.	Disorganized and lacks a logical flow.
Visual Appeal (5 Points)	Visually appealing; well-designed; effective use of multimedia.	Organized and visually appealing with minor design issues.	Somewhat visually appealing but lacks effective design elements.	Poorly designed or visually unappealing.	Disorganized, unattractive, and does not enhance presentation.
Clarity and Delivery (10 Points)	Clear, engaging, and confident delivery; excellent pacing and articulation.	Mostly clear with minor delivery or pacing issues.	Somewhat clear but has noticeable issues with delivery or pacing.	Unclear or poorly delivered; significant pacing or articulation issues.	Unclear and poorly delivered; major issues with pacing and articulation.
Peer Review Feedback (5 Points)	Constructive, detailed, and insightful feedback; well-incorporated.	Helpful feedback with minor gaps; most feedback incorporated.	Some feedback with limited detail; minimal incorporation.	Minimal or superficial feedback; little to no incorporation.	No feedback or unhelpful feedback; not incorporated.