Forensic Molecular Biology/4590/Section 001

Instructor Information

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Course Description, Structure, and Objectives

Experiments in evidence processing and forensic DNA analysis. Lectures and exercises include DNA extraction techniques, DNA quantification, PCR amplification of polymorphic nuclear and mtDNA loci, and fragment analysis utilizing capillary electrophoresis.

The course consists of weekly lectures ***in-person*** that integrate with concurrent enrollment in the hands-on Lab (4590.301 or 302). Students *must* have completed BIOL/BIOC 4570 or its equivalent. Students should understand the basics of human genetics, molecular biology, biochemistry, and population genetics prior to enrolling in this course.

Upon successful completion of this course, students will have been introduced to essential aspects of biological evidence and applied molecular biology techniques from the crime scene to the courtroom. This course will focus on practical knowledge and application in order to prepare students for a career in forensic biology/DNA. Students will learn:

- Biological evidence collection, preservation, and storage within a multi-disciplinary framework;
- Methodology and Technology;
- Data Analysis, Evaluation, Interpretation, and Statistical Models;
- Communicating complex scientific information and findings;
- Ethics in Forensic Science;
- Laboratory Quality Assurance requirements.

Subject matter warning

By the nature of its intersection with the criminal justice system, the material covered in this course will necessitate the use of graphic imagery and discussion of difficult subject matter such as, but not limited to, homicide, sexual assault, and violent crimes against persons, children, and/or animals. Students are forewarned that frank discussion of the details of such incidents is paramount in discovering potential biological evidence for forensic testing and is an integral part of a career in forensic science. Students are encouraged to support each other, be mindful of their classmates, and bring any concerns they have to the instructor immediately. The instructor is available by email, during office hours, or by appointment.

Required/Recommended* Materials

- Textbooks*

Fundamentals of Forensic DNA Typing
1st Edition - August 20, 2009, John Butler

Advanced Topics in Forensic DNA Typing: Methodology*

1st Edition - July 21, 2011, John Butler

Advanced Topics in Forensic DNA Typing: Interpretation*
1st Edition - July 28, 2014, John Butler

- ***Materials uploaded onto Canvas for reading supplement lecture content. It is strongly recommended that you read this material as it will be part of the examinations.***
- Additional course materials will be made available in Canvas during the semester.
- Supplementary materials and/or readings will be provided through individual learning modules as needed. Students will be expected to use library resources to read current forensic science literature.
- Technology requirements for courses with digital materials:

  This course has digital components. To fully participate in this class, students will need internet access to reference content on the Canvas Learning Management System. Students will need access to webcam and microphone for optional remote delivery of material if in-person classes are not possible due to inclement weather, etc. Exams/Assignments may require the use of computer/device during class time. If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at Learn Anywhere (https://online.unt.edu/learn).

How to Succeed in this Course

Assessment of competencies

Students will be provided with foundational principles of forensic molecular biology and related topics and expected to apply this knowledge in assignments and examinations. These will mimic as closely as possible the types of assessments students will encounter in a professional forensic laboratory setting.

Assignments

Assignments are designed to supplement lecture material. It is in the best interest of the student to complete the assignments. Material covered by the assignments will not be covered in detail in lecture and will be included in the examinations

Attendance

If a student has a legitimate reason for an absence, this should be communicated with the instructor prior to the absence whenever possible. ***Students are responsible for material covered in the lectures whether or not they attend class.***

Research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the Student Attendance and Authorized Absences Policy (PDF)(https://policy.unt.edu/sites/default/files/06.039_StudAttnandAuthAbsence.Pub2_.19.pdf).

Absence for Religious Holidays: (http://www.unt.edu/catalog/undergrad/enrollment.htm): A student absent due to the observance of a religious holiday may take examinations/complete assignments scheduled for the day(s) missed within a reasonable time after the absence. Class participants must notify the instructor, in writing, of planned absences for religious holidays by the 12th day of the beginning of the class.

*Participation in University Sponsored Activitie*s: such as athletics, debate, musical

organizations, AFROTC, class field trips, etc., must be authorized by the student's academic dean. Within three days after the absence, students must obtain authorized absence cards from the Dean of Students for presentation to their instructors.

Absence for Military Service: In accordance with section 51.9111 of the Texas Education Code, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. The maximum time for which the student may be excused has been defined by the Texas Higher Education Coordinating Board as "no more than 25 percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is currently enrolled at the beginning of the period of active military service." The student will be allowed a reasonable time after the absence to complete assignments and take exams. Policies affecting students who withdraw from the University for Military Service is given in the Withdrawal section.

COVID-19 Impact on Attendance: Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

If you are experiencing any symptoms of COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

It is important for all of us to be mindful of the health and safety of everyone in our community, especially given concerns about COVID-19. Please contact me if you are unable to attend class because you are ill, or unable to attend class due to a related issue regarding COVID-19.

ADA accommodation

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodation at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members can ask students to discuss such letters during their office hours to protect the student's privacy. For additional information, refer to the Office of Disability Access website (http://www.unt.edu/oda). You may also contact ODA by phone at (940) 565-4323. A student needing accommodation can connect with the Office of Disability Access to begin the registering process (https://studentaffairs.unt.edu/office-disability-access).

Communication

Active discussion in the classroom and on Canvas is encouraged. Interactions with your fellow students and the instructors enrich the learning experience. Opportunities will be available throughout the course for extensive interaction. Active participation is essential to success.

Students may also connect with the instructor through email and/or by attending office hours. During busy times, email becomes full, so if a response is not forthcoming within two business days, please send a follow up email. A gentle nudge is always appreciated. Office hours offer an opportunity to ask for clarification or find support with understanding class material. Additional office hours, in person and virtually, will be offered as the semester concludes. Your success is our goal.

Communication through Canvas messaging is preferred over direct email for any communication related to the course.

Successful Learning Environment

The value of the diversity of perspectives students bring to our campus is integral to a successful learning environment. The classroom culture relies on open communication, mutual respect, and inclusion of all perspectives. All discussions should be respectful and civil. Although disagreements and debates are encouraged, personal attacks are unacceptable.

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. Please review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (https://deanofstudents.unt.edu/conduct).
Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004) The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities.

The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate. Acceptable Student Behavior Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (Links to an external site.) (https://deanofstudents.unt.edu/conduct) to learn more. Student Evaluation Administration Dates Student feedback is important and an essential part of participation in this course.

Course Requirements/Schedule*

Week	*Date*	*Topic*	*Assignment*	*Associated Lab*
Week 1	20-Jan-23	Course Introduction; Role of the Forensic Scientist; Human Factors	*Forensic Laboratory Accreditation (10 pts) – Due 3-Feb-23*	Lab Introduction; *After Innocence*; Ethics assignment
Week 2	27-Jan-23	Evidence collection, preservation, storage; Evidence Examination for body fluids and other biological material; Serological testing		Pipetting; Ethics Assignment Discussion
Week 3	3-Feb-23		*Current trends in body fluid identification (10 pts) – Due 17-Feb-23*	Case Assignments; Evidence examination; Body Fluids (weeks 3-5)
Week 4	10-Feb-23			
Week 5	17-Feb-23	*DNA Analysis: Extraction to Quantitation*	*Non-Autosomal STRs and other DNA technologies (10 pts) – Due 3-Mar-23*	
Week 6	24-Feb-23			*DNA extraction (week 6-7)*
Week 7	3-Mar-23	*Review/Discussion for midterm*	*Midterm due 9-Mar-23 250 points*	*No lab (week 8)*
Week 8	10-Mar-23	*DNA Analysis: Extraction to Quantitation*		*DNA Quantification, Normalization, Amplification (week 10)*
Week 9	17-Mar-23	*SPRING BREAK*		
Week 10	24-Mar-23	Midterm Exam Discussion; DNA Analysis: Separation, Data evaluation, interpretation, statistics	DNA- Mixtures/TPPR (10 pts), Due 7-Apr-23	*Separation and Data Analysis (week 11)*
Week 11	31-Mar-23	DNA Analysis: Separation, Data evaluation, interpretation, statistics (continued)		*Data analysis continued, statistics, forensic comparisons (week 12)*
Week 12	7-Apr-23	Lineage markers, DNA databases; Communicating scientific information; Technology integration and Emerging Technologies	BGA/EPI/FIGG/Phenotyping (10 pts), Due 28-Apr-23	*Final reports, case file completion (week 13)*
Week 13	14-Apr-23			*Mock Court Preparation (week 14)*
Week 14	21-Apr-23			
Week 15	28-Apr-23	TBD		*Mock Court (week 15-16)*
Week 16	5-May-23	Review		
	11-May-23	Comprehensive Final Exam Due – 10AM, 300 points		

*Approximate schedule, subject to change. Students will be notified during class or through Canvas of adjustments to the schedule. Students will be notified by Eagle Alert if there is a campus closing that will impact a class and describe that the calendar is subject to change, citing the Emergency Notifications and Procedures Policy (PDF) (https://policy.unt.edu/sites/default/files/06.049_Standard%20Syllabus%20Policy%20Statements_supplement.pdf).

Assessing Your Work

Grading
A = 900-1000
B = 800-899
C = 700-799
D = 600-699
F = 500-599
Lecture: max 600 points

- Written Examinations: Mid-term, 250 points; comprehensive final, 300 points.
- Assignments: 50 points.
    - ***Late assignments*** **incur a 20% daily penalty** unless the student has made prior arrangements. Extensions without penalty will only be granted for legitimate reasons, as determined by the professor ONLY if the student makes the request in advance, or concurrently, if it is related to unforeseen circumstance such as illness.

Final grade is a combination of lecture (600 points) and a maximum of 400 points from the laboratory.
Grades are based on mastery of the material; there will not be any grading on curves. Extra credit opportunities may be available at the discretion of the professor.

Examinations are open book. They test your ability to APPLY the information to simulated real-world scenarios. **The ONLY restriction is that you must complete the examination on your own. You cannot discuss the examination with anyone other than the professor. See academic Integrity policy below.**

All sources must be cited in assignments and on examinations. The citation style is not mandated; however, choose a professional style and use it consistently.

Academic Integrity
There is a **ZERO-TOLERANCE** policy in this course for violations of the Academic Integrity Policy. The nature of forensic science is such that any violation signifies an egregious ethical breach that is unacceptable in the field and it would be unconscionable to allow such a person to practice forensic science.

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Other Policies and Information

The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey, they will receive a confirmation email. For additional information, please visit the SPOT website (Links to an external site.) (http://spot.unt.edu/) or email spot@unt.edu.

Sexual Assault Prevention

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.