BIOL 4590: Forensic Molecular Biology Laboratory
Fall 2020 Syllabus

Course Instructor: Kristi Dutton, MS, MB (ASCP)^{CM} (kristi.dutton@unt.edu)
Lecture University of North Texas, Biology Department
Office hours: remote by appointment only

Lab TA: Tyler Armstrong (tylerarmstrong@my.unt.edu)
University of North Texas, Biology Department
Office hours: remote by appointment only

		Room
Lecture:	Remote	NA
Lab:	Instruction for the hybrid lab option is a combination of Remote and Face to Face (F2F). Students will meet once a week at one of the below times.	
	Tuesday 4:00 – 6:50pm [Group A]	LIFE A217
	Thursday 4:00 – 6:50pm [Group B]	LIFE A217

All students must be available during the times/days listed above for live ZOOM meetings. Other days and times may be required for ZOOM meetings if scheduling conflicts arise. Scheduling of live ZOOMs will be made in advance through Canvas.

Textbook: Fundamentals of Forensic DNA Typing
Author: John Butler, Academic Press, 1st Edition, 2010
ISBN 978-0-12-374999-4

(PDF version available on Canvas)

Course Credits: 3

Prerequisite/Concurrent Registration: BIOL/BIOC 4570 or its equivalent

Attendance Policy:
Attendance of scheduled in person meetings, live ZOOMs, and all online participation and activities are mandatory for all lectures, laboratory exercises, quizzes, assignments, and exams. Students are responsible for all lecture and laboratory material. Makeup assignments/exams will be considered on a case by case basis.

COVID-19 impact on attendance

While attendance is expected as outlined above, 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 (**Kristi.Dutton@unt.edu** and **Tyler.Armstrong@my.unt.edu**) if you are unable to attend class because you are ill, or unable to attend class due to COVID-19 including symptoms, potential exposure, pending or positive test results, or if you have been given specific instructions to isolate or quarantine from a health care provider or a local authority. It is important that you communicate with me ***prior to being absent*** so I may take appropriate steps about accommodating your request to be excused from class.

If you are experiencing any symptoms of COVID-19 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 Hotline at 844-366-5892 or COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure. While attendance is an important part of succeeding in this class, your own health, and those of others in the community, is more important.

Face coverings/Masks:
Face coverings are required in all UNT facilities. Students are expected to wear face coverings during this class and will be asked to leave if they do not comply. If you are unable to wear a face covering due to a disability, please contact the Office of Disability Access to request an accommodation. UNT face covering requirements are subject to change due to community health guidelines. Any changes will be communicated via the instructor.

Remote Instruction:
This course is a hybrid course, with material presented asynchronously or synchronously which is made viewable through Panopto or Zoom, both of which are integrated into Canvas. Laboratory material will be taught using a combination of F2F and remote activities which will require students to participate remotely using Zoom or an equivalent platform. In addition, the UNT fall schedule requires this course to have fully remote instruction beginning November 28th. Additional remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to a webcam and microphone to participate in remote portions of the class. Additional required classroom materials for remote learning include: technology necessary for viewing videos, the ability to scan and/or photograph case file documents for submission, and Microsoft Office Suite.

Class Recordings:
Asynchronous and synchronous sessions in this course will be recorded for students enrolled in this class section to refer to throughout the semester. Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.

Discussion Boards:
Formal discussion boards will not be required (with exception of the safety requirements attestation); however, students are encouraged to engage with each other and the instructors utilizing the discussion board utility in Canvas. This will allow for transparent and consistent communication among students and instructors.

Grading and course options:
Students will select either **Option 1** or **Option 2** the first week of classes. Options will determine how final grades are determined.

Option 1 – ALL REMOTE
Ethics assignment: 5%
Oral presentation: 5%
Written Exams: 60% (2 exams @ 30% each)
Research paper and corresponding assignments: 30%

Under Option 1, independent research assignments will be given the second week of class. Students will be required to document their progress weekly by submitting via email a 2-3 paragraph Word document. In addition, students will be required to submit a formal outline via email and participate in scheduled collaborative ZOOM sessions. Failure to participate in ZOOM sessions or submit a progress report and/or outline will result in a deduction of points from the total assignment grade.

Option 2 – REMOTE AND F2F LAB MEETINGS
Ethics assignment: 5%
Oral presentation: 5%
Written Exams: 60% (2 exams @ 30% each)
*Laboratory results, case file and corresponding assignments: 30%

*Under Option 2, at the point UNT closes to all in person instruction, supplemental assignments will be given to complete this portion of the student's grade. The number of assignments and point value will vary depending on the week and duration of the closure. Supplemental assignments may include writing SOPs, case studies, writing research articles summaries, and/or preparing data or reports pertaining to QA/QC, case files, etc.

At any point in the semester a student falls ill, tests positive for COVID-19, is directed to quarantine, is awaiting COVID-19 test results, or lives with a person who falls ill or tests positive for COVID-19, that student will revert to all remote instruction for the duration of the semester. Additional assignments will be given to supplement this portion of the final grade. The number of assignments will vary depending on the week the student reverts to all remote. Supplemental assignments may include writing SOPs, case studies, writing research articles summaries, and/or preparing data or reports pertaining to QA/QC, case files, etc.

Based on the number of students selecting Option 2, students will be divided into 2 groups, Group 1 and Group 2. Group 1 will attend labs on Tuesdays and Group 2 will attend labs on Thursdays. These group assignments, along with a seating chart will be implemented the first week of the semester and posted on Canvas. If 5 or fewer students select Option 2, all students will meet F2F on ***Thursdays***. Group and seating assignments will remain unchanged the duration of the semester.

Each student selecting Option 2 will maintain a designated **case file** folder. This folder is representative of a **case file** found in a real-world Forensic Biology laboratory and will be used to maintain ***ALL*** material relating to the testing of mock evidence. All completed documentation pertaining to the mock case (bench notes, laboratory protocols, chain of custody, case file worksheets, etc.) will be maintained in the **case file**. Students are required to completely document procedures during labs and after labs, as necessary. Periodically during the semester, the student will turn in his/her case file (either in person or electronically) for technical review and grading. Missing or incorrect information will result in deduction of points **each** time the lab notebook/case file is found to be incomplete. Students are expected to correct these items before turning in the case file again.

*****Students selecting Option 1 will not be responsible for maintaining a case file BUT will be responsible for knowing and learning about all protocols, worksheets, COC, etc. that make up the case file.**

Course Objectives: This is an intensive laboratory course designed to give students experience and expertise in the basic molecular techniques currently utilized by many forensic laboratories performing forensic DNA analysis. Experience gained in this course may be through hands-on, in person labs or via remote research of a forensic DNA testing lab's procedures. Methods covered include a variety of DNA extraction techniques from different sources, DNA quantification, PCR amplification of selected polymorphic nuclear/autosomal loci, and fragment analysis utilizing capillary electrophoresis. Laboratory exercises will be carried out sequentially in a "mock case" format where possible. The laboratory portion will not only give the students hands-on experience with a variety of forensic techniques, but will also train the student in proper record-keeping, laboratory QA/QC, and performing routine laboratory calculations. Integrated lectures will provide the student with a deeper understanding of the scientific foundation for and development of each method. This is expected to allow students to later train individuals themselves as methods evolve, independently monitor and trouble-shoot theirs or another person's work, and to effectively explain methods/results to criminal investigators, attorneys, and juries.

Exam Policy: All exams will be in written format and may be composed of free response/long essay and/or short answer questions.

Laboratory Requirements: Each student selecting Option 2 is expected to provide his/her own laboratory coat (disposable are acceptable), a combination lock, and a folder/binder representative of a Forensic Biology case file. Lab coats are for this course only and are required to be kept in your locked cabinet for the duration of the semester. Latex gloves & safety goggles will be provided. Please inform the instructor in advance of any allergies or any other health issues that might affect or impair his/her ability to participate fully in this course. Masks must be worn ***CORRECTLY*** at ALL times when meeting for the entirety of in person class meetings on campus.

Laboratory Safety: During this laboratory course, the student will be handling and processing human biological material. The student may be expected to provide his/her own biological material (blood, saliva and hair) for some exercises. The student will receive instruction in the proper handling and precautions used when examining this type of evidence. Students will also be instructed in the proper handling of any chemical hazards they might encounter during this course. **In case of an accident or spill notify the instructor immediately. A first aid kit is located in the laboratory.**

Pregnancy: A student who is pregnant, suspects that she is pregnant, or becomes pregnant during the course should consult the *Student Handbook* heading *"Participation in Special Environments"* for information. The Course Director will be available to assist you.

Academic Dishonesty: According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to 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.

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

Detailed List of Covered Laboratory Protocols:

Good Laboratory Practices
QA/QC Procedures
Evidence Handling and Chain of Custody
Presumptive & Confirmatory Tests for Biological Materials/Fluids
Organic Phenol Chloroform Extraction
Chelex Extraction and Solid Phase Extraction
Differential Extraction of Semen-Containing Samples (sexual assault mixtures)
FTA Extraction (blood and buccal)
Quantifiler® DNA Quantification (Real-Time PCR, qPCR)
PCR Amplification of Autosomal and Y-Specific STR Loci
Genotyping via Capillary Electrophoresis (ABI 3130*xl*)
Genetic Data Analysis and Interpretation
Forensic Serology/DNA Case File Preparation and Report

Approximate Lecture/Laboratory Schedule

Date	**Topic**
Week 1	Course Introduction, Case File, Safety, Understanding the Human Genome
Week 2	Evidence Handling and Screening
Week 3	Evidence Screening, Historical Methods
Week 4	Presumptive and Confirmatory Tests (Blood)
Week 5	Presumptive and Confirmatory Tests (Semen)
Week 6	DNA Degradation, Pipetting
Week 7	Best Practices in the Forensic Molecular Lab/Exam 1
Week 8	DNA Extraction Methods
Week 9	DNA Extraction Methods
Week 10	DNA Quantification (qPCR: human-DNA-specific)
Week 11	PCR Amplification, Ethics
Week 12	STR Genotyping/Capillary Electrophoresis, Ethics
Week 13	Genetic Data Analysis and Interpretation/Oral Presentations
Week 14	Other Markers used in DNA Testing
Week 15	Profiles and Interpretation
Week 16	Finals Week

This syllabus is tentative and subject to change with advanced notice from your instructor where applicable. Dates above are estimates of the week these activities will fall on.