

**BIOT 6340****DNA Forensics****Credit Hours: 3****Semester:** Spring  
**Class Day/Time:** TBA**Year:** 2013  
**Class Location:** BMR 116**Instructor of Record:** Dr. Amy Tvinnereim

Professor

Office: BMR Rm 608  
Office Phone: 903-877-5189  
E-Mail: Amy.Tvinnereim@uthct.edu  
Office Hours: M 8-9am & 1-2pm, F 8-10am

**Course Description:** Forensic DNA analysis will provide students an understanding of the science of DNA analysis in criminal investigation. Students will gain an understanding of the history of forensic DNA analysis, sample collection and storage, DNA extraction, quantitation, amplification and separation, STR marker analysis, and analysis of non-autosomal DNA including mitochondrial DNA, Y-chromosome DNA, and X-chromosome DNA.

**Prerequisite:** As per program admission**Co-requisite:** None**Goals of Course & Course Objectives:***Course Objectives:*

1. Understand the history of forensic DNA analysis
2. Describe process of sample collection and storage
3. Understand techniques used to extract, quantitate, amplify and separate DNA for analysis
4. Understand STR analysis of DNA
5. Understand analysis of non-autosomal DNA such a mitochondrial DNA, Y-chromosome DNA and X-chromosome DNA.
6. Understand the legal aspects of DNA testing and the role of the scientific expert in the courts

**Student Learning Outcomes (Course Competencies):**

1. The student will be able to explain the techniques used to obtain DNA samples and proper storage of the samples.
2. The student will be able to explain the techniques used to extract, quantitate, amplify and separate DNA from forensic samples.
3. The student will be able to explain the techniques used to analyze forensic DNA samples.
4. The student will be able to explain the analysis of non-autosomal DNA samples.
5. The student will be able to explain problems associated with working with forensic DNA samples that have low levels of DNA present.
6. The student will be able to explain the role of DNA testing in the court system.

**Course Assessment/Methods of Evaluation:**

The student's understanding will be evaluated with comprehensive exams and participation in discussions in class and/or online. Exams will consist of multiple choice and short answer questions from the textbook and from the lecture material. Discussions will be held on-line or in class.

- Exam I (40%)
- Exam II (40%)
- Discussion participation (20%).

### Grading

Grades will be based on the following scale

A – 90 – 100%

B- 80-89

C- 70-79

D- 60-69

Any grade below a D is failing. Any grade below a B is unacceptable for graduate school and may be considered an academic deficit.

### Linked Program Learning Outcomes:

The student learning outcomes listed above address the following Biotechnology Program PLOs:

- PLO-5. The student will explain the principles, mechanisms and interrelatedness of both in vivo and in vitro biochemical, molecular biological and genetic processes.

### Textbook:

*Advanced Topic in Forensic DNA Typing: Methodology*, John M. Butler, Academic Press;  
ISBN 978-0-12-374513-2

### Course Content:

- History of DNA Typing
- Sample Collection and Storage - Chapter 1
- DNA Extraction and Quantitation - Chapters 2 and 3
- PCR Amplification - Chapter 4
- Short Tandem Repeats and Capillary Electrophoresis- Chapters 5 and 6
- Quality Assurance and Validation - Chapter 7
- DNA data bases: Uses and Issues
- Missing persons/Disaster victim identification - Chapters 8 and 9, Appendix 2
- Degraded DNA
- Low level DNA Testing - Chapters 10 and 11
- Single Nucleotide polymorphisms - Chapter 12
- Y chromosome DNA testing - Chapter 13
- Mitochondrial DNA Analysis
- X-Chromosome Analysis- Chapter 14 and 15
- Non-human DNA
- New technologies and automation - Chapter 16 and 17
- Legal Aspects of DNA Testing - Chapter 18, Appendix 4

**Other Class Policies:****Attendance:**

Regular or punctual attendance is expected. If a student misses a class or lab, the student is responsible for obtaining any information distributed during those times. Make-ups are possible only under certain instances (labs cannot be made up). Arrangements for any make-ups and/or missed labs should be discussed directly with the instructor for that day's class.

**Academic Honesty:**

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

*Cheating*

Dishonesty of any kind involving examinations, assignments, alteration of records, wrongful possession of examinations, and unpermitted submission of duplicate papers for multiple classes or unauthorized use of keys to examinations is considered cheating. Cheating includes but is not limited to:

- Using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class.
- Falsifying or inventing any information, including citations, on an assigned exercise.
- Helping or attempting to help another in an act of cheating or plagiarism.

*Plagiarism*

Plagiarism is presenting the words or ideas of another person as if they were your own. Materials, even ideas, borrowed from others necessitate full and complete acknowledgment of the original authors. Offering the work of another as one's own is plagiarism and is unacceptable in the academic community. A lack of adequate recognition constitutes plagiarism, whether it utilizes a few sentences, whole paragraphs, articles, books, audio-visual materials, or even the writing of a fellow student. In addition, the presentation of material gathered, assembled or formatted by others as one's own is also plagiarism. Because the university takes such misconduct very seriously, the student is urged to carefully read university policies on Misconduct in Research and Other Scholarly Activity 05.00. Examples of plagiarism are:

- Submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another.
- Submitting a work that has been purchased or otherwise obtained from an Internet source or another source.
- Incorporating the words or ideas of an author into one's paper without giving the author due credit.

**Adding/Dropping:**

The official deadline for adding and dropping courses is as published in the academic calendar and Graduate Bulletin (typically the day before Census Day). However, students are strongly encouraged to meet with their graduate advisor or the Program Coordinator prior to adding/dropping courses. Movement into and out of classes after the 4th class day requires approval of the Program Director. Students can drop until mid-semester without a WP or WF. Drops after mid-semester require approval of the Dean. Each student is responsible for their own enrollment status with the university.

**Disability Accommodations:**

UTHSCT abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, which mandate reasonable accommodations be provided for students with documented disabilities. If you have a disability and may require some type of instructional and/or examination accommodations, please contact me early in the semester so that I can provide or facilitate provision of accommodations you may need. If you have not already done so, you will need to register with the Student Services Office (located on the UT Tyler Campus). You may call 903-566-7079 for more information.