MARSHALL UNIVERSITY
Forensic Science Program

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FSC 603 DNA Laboratory
Spring 2025 – Wednesday 2:00pm – 4:50pm Annex

Instructor

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Office Hours: Monday – Thursday 9-11AM, or Call/email for appointment

Required Texts

None

Recommended Texts

Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers (John Butler 2005)
Advanced Topics in Forensic DNA Typing: Methodology (John Butler 2011)

Course Description

Laboratory to be offered in conjunction with FSC 604 Genetics and DNA Technology stressing techniques and methods required for DNA analysis used in forensic case investigations, in CODIS laboratories and in paternity testing. (1 hour)
Some Labs will only be one group and other labs will be both groups meeting. Dates are listed below and in the schedule at the end of the syllabus.

***LOCATION:* 2pm-5 pm in Annex 115/Annex Lab**
There will be two lab groups that will meet separately and together. See weekly schedule at the end of the syllabus

Prerequisites

Formal admission to the Forensic Science Program based on academic achievement, Hepatitis B immunization or waiver, supportive letters of recommendation, and passing a background check.

Goals

By the end of this course, students should successfully be able to perform a variety of forensic laboratory protocols in a modern Forensic DNA Laboratory and will acquire knowledge, skills and abilities in the application of basic laboratory procedures as applied to Forensic DNA testing, quality assurance and safety. In addition, students will receive an orientation to professional values, concepts, and ethics as they relate to the field of forensic DNA testing.

Objectives

By the end of this course, students should successfully be able to:

- Demonstrate basic laboratory skills and safety practices with all laboratory procedures such as:
  - Pipette technique
  - General lab equipment and maintenance
  - Sterile lab technique
  - MSDS interpretation
  - Proper use of PPE
  - Understanding controls and their proper use in the laboratory
  - Adhering to safety protocols for biological, chemical and fire hazards
- Develop and/or recognize proper documentation for handling evidentiary materials such as:
  - Chain of Custody (COC)

- Case submission form/evidence receipt
- Un-packaging submitted evidence and providing a detailed, written description
- Sampling evidence via the appropriate method
- Completing all associated procedural worksheets

- Perform DNA extractions and quantification from mock evidence by:
  - Normalizing DNA extracts as needed
  - Using commercial amplification chemistries
- Separate and detect amplified fragments by capillary electrophoresis
- Analyze raw data from the detection instrument by learning:
  - Operation of an analysis software
  - Relevant analysis settings (analysis range, sizing techniques, analysis threshold, etc.)
  - Allele designation settings
  - Evaluation of laboratory controls
- Interpret capillary electrophoresis data by learning:
  - Characteristics of amplified STR alleles
  - Characteristics of major technology-generated artifacts
  - Interpretation guidelines for single-source samples
  - Interpretation guidelines for forensic samples including mixtures
- Recognize quality assurance and ethical standards as they pertain to forensic casework, CODIS laboratories and paternity testing laboratories such as:
  - FBI Quality Assurance Standards for Convicted Offender DNA Testing Laboratories
  - FBI Quality Assurance Standards for Forensic DNA Testing Laboratories
  - American Association of Blood Banks (AABB)
  - International Standards Organization (ISO)

Evaluation/Assessment of Learner Objectives

There will be one major assignment required for the course:

- Creation of a mock case file that includes all documentation and work from the laboratory processes

Grading Policy

Laboratory performance (ability to follow directions!!) – 50 points
Completed case folder – 200 points

Grading Scale:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
59% and below	F

Attendance Policy

Attendance is Mandatory: Students enrolled in the Forensic Science Program are expected to attend all classes, laboratories, seminars, internship sessions, and presentations offered by guest speakers. If you are sick or are not able to make it to class, a phone call or e-mail is required BEFORE class time. If you are unable to take an exam on the selected day, arrangements must be made BEFORE the scheduled date to take the exam. Failure to do so will result in a failing grade. http://www.marshall.edu/wpmu/student-affairs/files/2011/08/Medical-Withdrawal-Policy.pdf

Student Absence Form: www.marshall.edu/forensics <Student Only> <Forms>; http://www.marshall.edu/forensics/student-resources; http://www.marshall.edu/forensics/faculty-resources-and-forms Completion of an Instructor-signed Student Absence Form is facilitated by the Student and sent on to the Program Coordinator for all absences. This may occur BEFORE the absence (recommended) or on the first day of class upon return. Whether the absence is EXCUSED or UNEXCUSED will dictate whether the student will be granted make-ups and whether they will receive point or grade reductions. Completed Absence Forms will be placed in the student's formal file. A Completed Absence Form is one bearing signatures of the student, instructor(s), and program coordinator. If the student is not able to attend class for any reason, a phone call or e-mail to the Instructor is required BEFORE class time as this is a standard employer practice.

Excused Absences: The Program Coordinator and Instructor must be notified of absences. Formal documentation is required for Excused Absences which may involve physician statements excusing the student from class, obituaries, or professional travel documentation. With an Excused Absence, the student may be asked to take an exam BEFORE the scheduled date. No exams, labs, or other formal exercises will be made up without an Excused Absence.

Examples of Excused Absences include:

- Personal Medical Emergency – Formal documentation is required from a licensed physician or appropriate healthcare provider
- Death in the Immediate Family – Documentation required
- Forensic Professional Travel – Documentation required. Marshall University Forensic Science Program, Marshall University, the West Virginia Policy Board for Higher Education is not liable for accidents or injuries incurred during trips within or out of the state.

Unexcused Absences: Any unexcused absence in which a student misses a lab or exam or other graded activity will result in the deduction of one letter grade from the student's final grade or a reduction of points as specified in the Course Syllabus. Any quizzes missed during an unexcused absence will result in a zero.

Medical Withdrawal: http://www.marshall.edu/wpmu/student-affairs/files/2011/08/Medical-Withdrawal-Policy.pdf

Final Grade Appeal: Any student who believes the final course grade is wrong may appeal the grade. See (http://www.marshall.edu/graduate/graduate-student-appeals/). The appeal is limited to three areas: a) The final grade assigned for a course is based on an obvious error (e.g. a clear error such as error in computing a grade or failure to grade one of the answers on an exam). b) Standards different from those established in written department, or Graduate College policies, if specific policies exist, were used in assigning the grade. c) The instructor departed from his or her previously articulated, written standards, without notifying graduate students, in determining the grade. There are several steps in the appeal process. These are designed to allow the student, faculty, and program director to correct the error or come to a mutual compromise before it goes to the Graduate College/College of Science Dean's Office for final review.

COVID-19 Related Information
Marshall's official COVID-19 protocols are online at https://www.marshall.edu/coronavirus (URL: https://www.marshall.edu/coronavirus/). Policies and protocols may change over time as we respond to changing conditions. The website will always contain the most recent information – check it frequently for the most current information.

Generative AI is fully prohibited in the course.

Students are prohibited from using generative AI in any way on any assignment in this course. The use of generative AI in this course will be considered a violation of both Marshall's **Academic Dishonesty Policy** (URL: https://www.marshall.edu/academic-affairs/policies/#academicdishonesty) and the **Student Code of Conduct** (URL: https://www.marshall.edu/student-conduct/files/Studnet-Code-of-Conduct-2022.pdf).

Campus Carry Policy

- University Policy, UPGA-12 (Campus Carry Policy) derives its authority from West Virginia State law, including the Campus Self-defense Act (W. Va. Code § 18B-4-5b). It pertains to the exercise of Concealed Carry on Marshall University's campus, except in designated areas, by individuals with a valid permit to Conceal Carry.

- Individuals who choose to Conceal Carry are responsible for knowing and understanding all applicable federal, state, and local laws and Marshall University Board of Governors Rules, University Policies, and Administrative Procedures. University Policy, UPGA-12 applies to areas of campus and buildings that are directly under the possession or control of Marshall University.

- Concealed Handguns are not observable to others and must be holstered and concealed on the body of the permit holder or in a personal carrier, such as a backpack, purse, or other bag that remains under the exclusive and uninterrupted control of the permit holder. This includes wearing the personal carrier with a strap, carrying or holding the personal carrier, or setting the personal carrier next to or within your immediate reach at all times. If your participation in class activities impedes your ability to maintain constant control of your Handgun, please make alternate arrangements prior to coming to class.

Faculty Office

- NOTICE: University Policy, UPGA-12 (Campus Carry Policy) defines Sole Occupancy Offices as areas that may restrict Concealed Carry. Please be aware that my office is a Sole Occupancy Office and this statement serves as notice that concealed weapons or handguns are not permitted in my office. If you plan to attend a meeting in my office or to drop by my office, secure your weapon or handgun appropriately before you arrive.

Tardiness

Due to the limited time frame of the class, it is imperative that students arrive on time and review all assigned procedures and protocols prior to the laboratory activity.

Punctuality: On time arrival is expected of all students. A point deduction of 20 points will be made if a lack of punctuality is persistent (>3 times for the semester).

Make-up Policy

The program coordinator and instructor must be notified of absences. Doctor's excuse may be required if more than one absence occurs.

Academic Dishonesty

Academic dishonesty in any form will not be tolerated. Plagiarism is defined as "submitting as one's own work or creation any material or an idea wholly or in part created by another. This includes oral, written, and graphical material, and both published and unpublished work. It is the student's responsibility to clearly distinguish his/her own work from that created by others. This includes the proper use of quotation marks, paraphrase, and the citation of the original source" (2008-2009, Graduate Catalog, p. 61). Refer to Marshall University Board of Governors Policy No. AA-12 Academic Dishonesty - http://www.marshall.edu/president/Board/Policies/MUBOG%20AA-12%20Academic%20Dishonesty.pdf – for complete details.

Policy for Students with Disabilities

Marshall University is committed to equal opportunity education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117 (304.696.2271) to provide documentation of their disability. Following this, the DSS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing, and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, access the website for the Office of Disabled Student Services: http://www.marshall.edu/disabled/

Affirmative Action Policy

It is the policy of Marshall University to provide equal opportunities to all prospective and current members of the student body, faculty, and staff on the basis of individual qualifications and merit without regard to race, color, sex, religion, age, disability, national origin, or sexual orientation. To obtain information on the implementation of the policy regarding nondiscrimination, contact the Director of Equity Programs, Old Main, Marshall University, Huntington, WV 24755 (304.696.2592)

Acceptable Use Policy

Access to Marshall University's resources is a privilege and is provided with an expectation of responsible and acceptable use. To read the principles and guidelines as well as federal, state, and local regulations, please go to http://www.marshall.edu/ucs/cs/accptuse.asp.

Inclement Weather Policy

In the case of inclement weather, please follow Marshall's procedures if any cancellations/delays occur. http://www.marshall.edu/ucomm/weather.html.

Miscellaneous

Laboratory Policies- Universal precautions will be observed at all times and all materials should be handled as though they are capable of transmitting diseases. The use of PPE is required at all times. While in the lab, unnecessary noise should be kept to a minimum to prevent distracting other students. It is the student's responsibility to be prompt and prepared for each laboratory meeting and have the appropriate pre-laboratory assignments for grading. Late assignments will incur a 10 % deduction per day to the final grade of each assignment. A strict timeline will be observed whenever possible. When delays cannot be avoided and students cannot complete their assigned laboratory activities, the laboratory will be open to student use as needed on select dates under direct supervision of the laboratory instructor. Make-up laboratory sessions will not be offered.

Week	Date	Topic
Week 1	Jan 15	Laboratory Intro Course Overview Pipetting Techniques Safety Serology / Evidence Processing / Note Taking ***Group A***
Week 2	Jan 22	Laboratory Intro Course Overview Pipetting Techniques Safety Serology / Evidence Processing / Note Taking ***Group B***
Week 3	Jan 29	Known Sample Extractions, Manual DNA IQ ***Groups A and B***
Week 4	Feb 5	Manual Differential Separation / DNA IQ Extraction ***Group A***
Week 5	Feb 12	Manual Differential Separation / DNA IQ Extraction ***Group B***
Week 6	Feb 19	***AAFS – No Class***
Week 7	Feb 26	Quantitation Qs and Ks ***Group A and B***
Week 8	March 5	Quantitation Data Analysis Calculating Dilutions or Concentrations Calculating Amplification Loads ***Group A***
Week 9	March 12	Quantitation Data Analysis Calculating Dilutions or Concentrations Calculating Amplification Loads ***Group B***
Week 10	March 19	***Spring Break – No class***
Week 11	March 26	Amplification CE Overview **Group A**
Week 12	April 2	Amplification CE Overview ***Group B***
Week 13	April 9	Capillary Electrophoresis Set Up and Run ***Group A and B***
Week 14	April 16	Data Analysis ***Group A and B***
Week 15	April 23	Data Analysis ***Group A and B***
Week 16	****April 30 ****	Case file due ***Group A and B***
Week 17	May 7	***No Class***

~This is subject to change at any time~