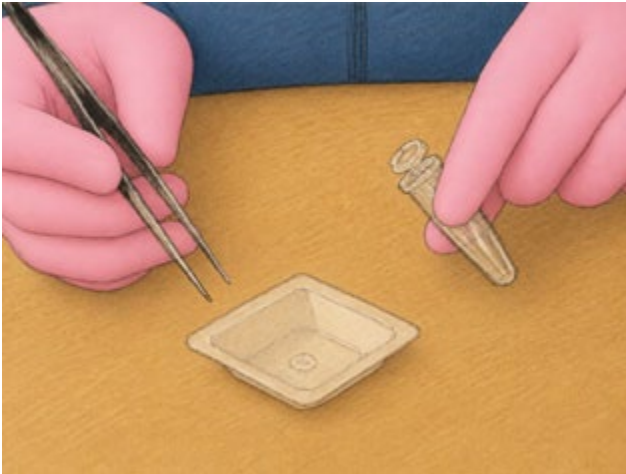


Advanced DNA

Tuition: \$600.00 | 90-Day Access | Preregister at: www.ForensicTraining.online



Course Description:

Advanced DNA expands upon foundational forensic DNA concepts by exploring specialized genetic markers and testing approaches used in modern forensic identification, kinship analysis, missing-person investigations, cold cases, and other complex forensic applications.

Designed for professionals who already possess a basic understanding of forensic DNA, this course examines the characteristics, inheritance patterns, strengths, limitations, and forensic applications of **autosomal STRs, X-STRs, Y-STRs, mitochondrial DNA (mtDNA), and single nucleotide polymorphisms (SNPs)**.

Participants will learn why different types of genetic markers may be selected for different forensic questions and how each can contribute unique information when traditional DNA testing may not provide the complete answer.

Who Should Take This Course?

Advanced DNA is designed for forensic scientists, DNA laboratory personnel, crime scene investigators, law enforcement investigators, evidence professionals, attorneys, forensic consultants, students, and other criminal justice professionals who want to expand their knowledge beyond foundational forensic DNA concepts.

Course Modules:

STRs – Short Tandem Repeats

Explore the principles and forensic applications of **autosomal Short Tandem Repeat (STR) analysis**, one of the primary approaches used in modern forensic DNA identification.

Participants will examine STR inheritance, genetic loci, DNA profiles, comparisons, mixtures, and the advantages and limitations of STR testing. The module also explores how STR profiles are applied to forensic casework and DNA database searching.

X-STRs – X-Chromosome Short Tandem Repeats

Examine the specialized forensic applications of **X-chromosome STR analysis** and the unique inheritance characteristics of the X chromosome.

Participants will learn how X-STR testing can supplement traditional autosomal DNA analysis in certain complex kinship and relationship-testing scenarios and why understanding inheritance patterns is essential when evaluating X-STR results.

Y-STRs – Y-Chromosome Short Tandem Repeats

Explore the principles and applications of **Y-chromosome STR analysis**, including the paternal inheritance of Y-chromosome DNA.

Participants will examine how Y-STR testing can assist in cases involving male DNA, particularly when male DNA is present with a much larger amount of female DNA. The module also addresses paternal lineage, haplotypes, forensic applications, and important limitations associated with Y-STR interpretation.

mtDNA – Mitochondrial DNA

Learn how **mitochondrial DNA analysis** provides an alternative approach when nuclear DNA testing is limited or unsuccessful.

Participants will explore maternal inheritance, mitochondrial DNA characteristics, heteroplasmy, and the forensic applications of mtDNA testing. Special attention is given to challenging evidence such as hair shafts, bones, teeth, degraded remains, missing-person cases, unidentified human remains, and historical or cold case evidence.

SNPs – Single Nucleotide Polymorphisms

Explore the expanding role of **Single Nucleotide Polymorphisms (SNPs)** in forensic genetics.

Participants will examine how SNPs differ from traditional STR markers and how large SNP panels can provide valuable information for human identification, kinship analysis, degraded DNA, ancestry-related investigative information, and Forensic Investigative Genetic Genealogy (FIGG).

What You Will Learn:

Upon completion of **Advanced DNA**, participants should be better prepared to:

- Explain the differences between STRs, X-STRs, Y-STRs, mtDNA, and SNPs.
- Describe how different genetic markers are inherited.
- Recognize the strengths and limitations of each DNA testing approach.
- Understand why a forensic laboratory may select one type of DNA analysis over another.
- Explain the role of autosomal STRs in forensic identification and database comparisons.
- Recognize situations in which X-STR or Y-STR testing may provide additional information.
- Understand the value of mtDNA analysis for degraded evidence, hair, skeletal remains, missing-person cases, and cold cases.
- Describe the expanding forensic applications of SNP analysis.
- Understand how specialized DNA testing can supplement traditional forensic DNA analysis.
- Better evaluate the type of DNA testing that may be appropriate for different forensic and investigative questions.