Latest Techniques and Interpretation in Forensic DNA Analysis Training Course

Professional Development Training Course Outline

Category	Criminology	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The rapid advancement in forensic science has revolutionized the way criminal investigations are conducted. Among the most pivotal developments is Forensic DNA Analysis, which has emerged as a cornerstone in identifying suspects, exonerating the innocent, and solving cold cases. Training Course on Forensic DNA Analysis: Latest Techniques & Interpretation is designed to equip forensic professionals, law enforcement personnel, and legal practitioners with cutting-edge knowledge and practical expertise in modern DNA profiling techniques, interpretation of complex DNA mixtures, and legal admissibility. Keywords such as STR analysis, mitochondrial DNA, genetic markers, and forensic evidence handling are embedded throughout this hands-on course to ensure relevance and depth.

With a strong focus on real-world case applications, this course integrates theoretical frameworks with advanced laboratory protocols, forensic bioinformatics, and courtroom presentation techniques. Participants will gain a solid understanding of DNA sequencing technologies, population genetics, contamination prevention, and ethical considerations in forensic DNA interpretation. Whether you're enhancing your laboratory skill set, preparing expert witness testimonies, or managing forensic casework, this course will keep you at the forefront of forensic biology innovations.

Programme Curriculum

Latest Techniques and Interpretation in Forensic DNA Analysis Training Course

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Course Objectives

1. Understand the principles of DNA extraction and quantification.
2. Explore advanced STR and Y-STR profiling methods.
3. Analyze mitochondrial DNA (mtDNA) and its forensic applications.
4. Apply Next-Generation Sequencing (NGS) in forensic settings.
5. Interpret DNA mixtures and low-template samples.
6. Develop skills in population genetics for forensic analysis.
7. Implement best practices for DNA evidence handling and chain of custody.
8. Address legal and ethical issues in forensic DNA use.
9. Use bioinformatics tools for genetic data interpretation.
10. Conduct quality assurance using ISO 17025 standards in DNA labs.
11. Learn case-based interpretation of complex DNA evidence.
12. Prepare effective expert witness reports and court testimonies.
13. Explore emerging trends in forensic DNA technology.

Target Audiences

1. Forensic Scientists
2. Crime Scene Investigators
3. Forensic Laboratory Technicians
4. Criminal Justice Professionals
5. Medical Examiners
6. Law Enforcement Officers
7. Legal Professionals and Prosecutors
8. Graduate Students in Forensic Science

Course Duration: 10 days

Course Modules

Module 1: Introduction to Forensic DNA Analysis

- Overview of forensic genetics
- Importance of DNA in criminal justice
- Types of DNA used in forensics
- DNA collection methods
- Historical milestones in DNA profiling
- *Case Study: The Colin Pitchfork Case (First DNA Exoneration)*

Module 2: DNA Extraction and Quantification Techniques

- Organic and Chelex extraction methods
- Magnetic bead-based extraction
- DNA quantification via qPCR
- Avoiding DNA degradation

- Contamination control measures
- *Case Study: Sexual Assault Kit Backlog Resolution Projects*

Module 3: STR and Y-STR Profiling

- Short Tandem Repeat (STR) analysis
- Autosomal vs. Y-STR comparison
- Allelic ladders and profiles
- Stutter peaks and interpretation
- CODIS and database implications
- *Case Study: Identifying Unknown Human Remains*

Module 4: Mitochondrial DNA (mtDNA) Analysis

- Structure and inheritance of mtDNA
- When to use mtDNA in forensics
- Sequencing mtDNA regions
- Comparison with nuclear DNA
- Challenges in interpreting mtDNA
- *Case Study: Romanov Family Identification*

Module 5: Next-Generation Sequencing (NGS) in Forensics

- Fundamentals of NGS technology
- Advantages over traditional profiling
- SNP analysis using NGS
- Library preparation and data output
- Forensic case resolution with NGS
- *Case Study: Solving Cold Cases with NGS*

Module 6: Interpretation of DNA Mixtures

- Defining and recognizing mixed samples
- Stochastic effects and allele drop-out
- Probabilistic genotyping software
- Analytical thresholds
- Interpretation challenges
- *Case Study: The Amanda Knox DNA Evidence Debate*

Module 7: Low Copy Number (LCN) DNA Analysis

- Sensitivity of LCN techniques
- Enhancing trace DNA evidence
- Risks of contamination
- Application in property crimes
- Legal issues with LCN admissibility
- *Case Study: Baby Doe Boston Case*

Module 8: DNA Contamination Prevention & Evidence Handling

- Lab protocols for contamination control
- Proper evidence packaging
- Chain of custody documentation
- Clean room and PPE use
- DNA transfer risks
- *Case Study: Cross-contamination in the O.J. Simpson Trial*

Module 9: Population Genetics in Forensic Science

- Allele frequency databases
- Hardy-Weinberg equilibrium
- Match probability and RMP
- Likelihood ratios
- Forensic statistical interpretation
- *Case Study: DNA Database and False Positives*

Module 10: Quality Control and Accreditation (ISO 17025)

- Principles of ISO 17025
- Internal and external audits
- Proficiency testing
- Documenting lab procedures
- Maintaining chain of evidence
- *Case Study: DNA Lab Shutdown Due to QA Failures*

Module 11: DNA Evidence in Courtroom Settings

- Preparing for expert testimony
- DNA evidence admissibility (Daubert/Frye)
- Communicating science to juries
- Courtroom visuals and exhibits
- Cross-examination strategies
- *Case Study: The Casey Anthony Trial*

Module 12: Ethical and Legal Aspects of DNA Forensics

- Privacy and genetic information
- Retention of DNA samples
- Familial searching ethics
- Informed consent
- Legal regulations and reforms
- *Case Study: Golden State Killer and Genetic Genealogy*

Module 13: Cold Case Investigations and DNA Applications

- Cold case reopening protocols
- Retesting old evidence
- Using genealogical DNA databases
- Collaboration with law enforcement
- Challenges of degraded samples
- *Case Study: Identification of Joseph James DeAngelo*

Module 14: Bioinformatics and Forensic DNA Databases

- Software tools for DNA interpretation
- DNA profile comparison
- Data management in CODIS
- Cybersecurity in forensic databases
- Predictive modeling with DNA
- *Case Study: STRmix Probabilistic Software Use*

Module 15: Future Trends in Forensic DNA Analysis

- Artificial intelligence in DNA analysis

- Rapid DNA technology
- Predictive phenotyping
- Mobile DNA labs
- Policy and tech convergence
- *Case Study: Use of Parabon Nanolabs for Facial Reconstruction*

Training Methodology

- Instructor-led theoretical and practical sessions
- Interactive case study workshops
- Hands-on training with DNA software tools
- Mock courtroom testimony exercises
- Group discussions and peer evaluations
- Pre- and post-assessment for impact measurement

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com