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Revision History

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INTRODUCTION

1 Overview of General Laboratory Training Program

1.1 Purpose

Employees of the Texas Department of Public Safety (DPS) Crime Laboratory must begin their employment with a basic understanding of agency and crime laboratory purpose, policy, operation, safety, and administrative procedures.

The General Laboratory Training (GLT) program covers topics related to general knowledge of forensic science, the application of ethical practices in forensic science, general safety, evidence handling, criminal and civil law, courtroom testimony, and forensic testing laboratory information management systems (LIMS). This training manual also covers topics related to records and information management, quality assurance, and measurement uncertainty.

1.2 Requirements

- A. All employees shall have the minimum qualifications detailed in the approved job descriptions maintained by Human Resources.
- B. All new employees must complete the New Employee Orientation Packet (HR-26) located on DPSnet. Documents must be submitted to Human Resources on the day of hire unless specified otherwise.

1.3 Program Format

A. Key Concepts

1. The General Laboratory Training modules may be completed in any order, except for any prerequisite(s) required by the module or discipline specific requirements.
2. The General Laboratory Training modules must be completed prior to or concurrently with the various discipline training manuals, unless there is a discipline prerequisite requirement. The GLT must be completed prior to beginning work on test or calibration samples.
3. Readings required for the licensure program from the Texas Forensic Science Commission have been included in this training manual. Employees who are required to become licensed will register in TopClass to access these readings and to schedule their licensing exam upon completion of the GLT.

B. Fundamentals Unit (Part I)

1. The Fundamentals Unit introduces the trainee to general laboratory practices and agency policies, laboratory safety, evidence handling, ethics and professionalism, quality assurance, and records and information management.
 - a) *New Employee Orientation module ([Chapter 3](#)) introduces the trainee to the overall operation of the Texas Department of Public Safety and the Crime Laboratory System at the basic level.*
 - b) *General Safety module ([Chapter 4](#)) describes the Laboratory's Health and Safety Program.*
 - i. *Completion of this module does not authorize an individual to handle firearms; optional additional firearms training can be requested from the Firearms Section.*
 - ii. *This module is not a substitute for a first aid course.*



- c) *Forensic Science module ([Chapter 5](#)) provides a broad overview of the many forensic science disciplines.*
 - d) *Forensic Testing LIMS module ([Chapter 6](#)) introduces the trainee to the Laboratory's information management system (LIMS) for forensic testing.*
 - e) *Evidence Handling module ([Chapter 7](#)) introduces the trainee to concepts of evidence integrity, proper seals, and chain of custody. This module is optional for Breath Alcohol and CODIS.*
 - f) *Ethics and Professionalism module ([Chapter 8](#)) focuses on the policies and ethics statements that all employees are expected to follow and addresses the potential for bias and approaches for minimizing cognitive bias in forensic work.*
 - g) *Introduction to Quality Assurance module ([Chapter 9](#)) introduces the trainee to concepts of forensic quality assurance and details the internal processes and external oversight used to ensure standards of quality are met.*
 - h) *Introduction to Records and Information Management module ([Chapter 10](#)) introduces the trainee to policies regarding records release and records retention.*
2. Successful completion of the assigned module(s) in the Fundamentals Unit is mandatory for all laboratory personnel.
- C. Forensic Legal Unit (Part II)
1. The Forensic Legal Unit includes basic court testimony, an overview of the court structure and legal processes, and legal opinions of particular significance to forensic laboratories.
 - a) *Overview of Legal Processes and Testimony module ([Chapter 11](#)) familiarizes the trainee with basic legal terminology, the Federal and Texas court system structures and procedures, and the basics of courtroom testimony. CODIS personnel are not required to observe courtroom testimonies.*
 - b) *Rules of Evidence and General Legal Opinions module ([Chapter 12](#)) discusses the rules of evidence for expert witnesses and significant rulings which impact scientific testimony.*
 - c) *Discipline-Specific Legal Opinions ([Chapter 13](#)) contains supplemental material which provides discipline-specific legal opinions.*
 2. Successful completion of the Forensic Legal Unit is mandatory for examiners, technical support, and managerial personnel.
- D. Advanced Topics Unit (Part III)
1. Measurement Uncertainty module ([Chapter 14](#)) introduces the trainee to the terminology and concepts of measurement uncertainty for the measurements reported by the Laboratory and prepares the trainee to explain the concepts in court.
 - a) *The Measurement Uncertainty module is mandatory for testifying laboratory personnel in the Toxicology (Alcohol/Volatiles and Drugs), Breath Alcohol, Seized Drugs, and Firearms & Toolmarks disciplines.*
 - b) *The Measurement Uncertainty module is strongly recommended for testifying laboratory personnel in the Trace Evidence, Friction Ridge, Biology/DNA, and Forensic Document Examination disciplines.*



2. Advanced Quality Assurance module ([Chapter 15](#)) familiarizes the trainee with advanced topics in quality assurance and is mandatory for laboratory personnel in Top Management or Key Management positions (refer to the *Laboratory System Roles and Responsibilities* chapter of the CLS Manual).
3. Advanced Evidence Handling module ([Chapter 16](#)) familiarizes the trainee with the process and procedures for receiving, returning, inventorying, destroying and transferring evidence while ensuring evidence integrity and is mandatory for laboratory specialist positions that have evidence coordination duties.

1.4 Responsibilities

A. Trainer Responsibilities

1. The trainer is responsible for training, evaluating the trainee's progress and assignments, planning future study and practical assignments, and discussing any deficiencies with the trainee which require additional training.
2. Meetings between the trainee and the trainer and/or supervisor should be held at least weekly in order to ensure robust training (refer to the *Employee Training Program* chapter of the CLS Manual).

B. Trainee Responsibilities

1. The trainee is required to keep up with reading assignments on a self-study basis and maintain a training notebook.
2. The trainee is responsible for informing his/her trainer or supervisor when problems arise at any time during the training period.

1.5 Review and Authorization

A. Training Notebook

1. During the training program, the trainee is responsible for keeping detailed training records in a training notebook.
2. The items to be maintained in the training notebook are described below:
 - a) *General Laboratory Training checklists are used with the corresponding modules. The Training Record form (LAB-303) may be used in conjunction with the checklists to document additional literature readings, training videos, and courtroom testimony observed for training.*
 - b) *Print-outs of training modules should not be included in the notebook, unless the trainee documented completion of training elements on the printed copy.*
3. Upon completion of training, the notebook is reviewed by the trainer and/or supervisor, the Quality Manager and/or local Quality Assurance Specialist, and System Quality Assurance.

B. Certificate of Completion

1. A Certificate of Completion form (LAB-308) is completed and submitted to System Quality Assurance following completion of the assigned units (Fundamentals, Forensic Legal, and/or Advanced Topics: Measurement Uncertainty, Advanced Quality Assurance) for approval by the Laboratory Director.
 - a) *For Advanced Evidence Handling, a Work Authorization Form (LAB-309) is completed and submitted to System Quality Assurance for approval by the Laboratory Director before the individual may handle and process evidence.*



2 General Laboratory Training Matrix

The following matrix describes which General Laboratory Training modules are required, optional, or conditional for the employee.

(☒ REQUIRED) (■ OPTIONAL) (■ CONDITIONAL – JOB FUNCTION DEPENDENT)

		ADM	TECH	EX	MT
Chapter 1	Overview	☒	☒	☒	☒
Fundamentals Unit					
Chapter 3	New Employee Orientation	☒	☒	☒	☒
Chapter 4	General Safety	☒	☒	☒	☒
Chapter 5	Forensic Science	☒	☒	☒	☒
Chapter 6	Forensic Testing Laboratory Information Management Systems (LIMS) [Optional for Breath Alcohol and CODIS]	☒	☒	☒	☒
Chapter 7	Evidence Handling [Optional for Breath Alcohol and CODIS]	☒	☒	☒	☒
Chapter 8	Ethics and Professionalism	☒	☒	☒	☒
Chapter 9	Introduction to Quality Assurance	☒	☒	☒	☒
Chapter 10	Introduction to Records and Information Management	☒	☒	☒	☒
Forensic Legal Unit					
Chapter 11	Overview of Legal Processes and Testimony	■	☒	☒	☒
Chapter 12	Rules of Evidence and General Legal Opinions	■	☒	☒	☒
Chapter 13	Discipline-Specific Legal Opinions	■	☒	☒	☒
Advanced Topics Unit					
Chapter 14	Measurement Uncertainty [Required for BA, BAL, SD, FTM, TOX]	■	■	■	■
Chapter 15	Advanced Quality Assurance	■	■	■	☒
Chapter 16	Advanced Evidence Handling [Required for Evidence Technicians]	■	■	■	■

Key:

ADM Administrative Support Staff

MT Managerial Team

- Forensic Scientist V
- Technical Leader
- Manager/Supervisor
- Quality Assurance Staff
- Program Specialists and Coordinators
- Director/Assistant Lab Director

EX Examiners

- Forensic Scientist I-IV

TECH

Technical Support

- Crime Lab Specialist (Evidence Technician, Lab Technician)
- Fingerprint Technician
- Electronics Technician



PART I: FUNDAMENTALS UNIT

3 New Employee Orientation

Duration 2 to 4 days

Purpose To provide an orientation to the Texas Department of Public Safety and the Crime Laboratory Service

Prerequisite None

3.1 Objectives

A. Theoretical

All employees must attend a Texas Department of Public Safety orientation session. As a new employee, it is important to become acquainted with department policy and procedures.

B. Practical

1. Following the completion of training, the trainee will:
 - a) *Be familiar with the overall organization and operations of the Texas Department of Public Safety (DPS) and the Crime Laboratory Service, including:*
 - i. *The objectives and missions of the DPS and Crime Laboratory*
 - ii. *The organization and chain of command in the DPS and in the Crime Laboratory*
 - iii. *The locations of the DPS laboratories throughout the state*
 - iv. *The DPS General Manual and the Crime Laboratory Service (CLS) Manual, including electronic access*
 - b) *Complete the New Employee Orientation-Packet (HR-26), which certifies review of departmental policy*
 - c) *Complete an electronic timesheet and become familiar with leave codes*
 - d) *Be familiar with expected conduct and attitude-related behaviors for job performance*
2. If applicable to their position, new employees will receive instruction on the proper use of vehicle gas cards and become familiar with the fleet vehicle use policy.
3. If applicable, employees may submit a completed application for a travel credit card and a signed Travel Card Use Agreement form (ACT-66).

3.2 Training Outline

A. Lesson Plan

1. Complete DPS New Employee Orientation Packet
2. Participate in Division Orientation
3. Introduction to Duty Station
 - a) *Introduction to management and coworkers*
 - b) *Tour of the assigned duty station facility*
 - i. *Designated work area(s)*
 - ii. *Office area*



- c) *Work Hours*
- d) *Facility Security and Procedures*
- 4. General Office Practices, Equipment, and Resources
 - a) *Telephones, Paging Systems, Faxes, Copiers, Scanners*
 - b) *Computers*
 - c) *Supplies*
 - d) *Business Cards*
 - e) *Contact information for building maintenance, IT, Security, HR, etc.*
- 5. Overview of DPS Operations (DPS General Manual)
 - a) *General Provisions (Chapter 1)*
 - b) *Laws Controlling the Department of Public Safety (Chapter 2)*
 - c) *Organization and Administration (Chapter 3)*
 - d) *Objective, Mission, and Program (Chapter 4)*
 - e) *Doctrines, Policies, and Operating Procedures (Chapter 5)*
 - i. *Budgetary/managerial suggestions*
 - ii. *Use of tobacco*
 - iii. *Gift solicitation*
 - iv. *Evacuation plans for department occupied facilities*
 - v. *Computer security*
 - f) *Professional Conduct (Chapter 6)*
 - g) *Personnel Policies, Procedures, Benefits, and Records (Chapter 7)*
 - i. *Temporary disability leave without pay*
 - ii. *Sick leave*
 - iii. *Vacation entitlement*
 - iv. *Holiday schedule*
 - v. *FLSA and compensatory equivalent overtime*
 - vi. *Emergency leave*
 - vii. *Jury duty*
 - viii. *Promotion and selection policy and procedure*
 - ix. *Transfer policy and procedure*
 - x. *Secondary employment of noncommissioned officers*
 - xi. *DPS Mutual Insurance policy*
 - xii. *Personal information*
 - xiii. *Address and telephone requirements and public disclosure restriction (including change of address)*

Note: FS I-V personnel, as "forensic analysts", fall into an eligible category to restrict public access to their home address by removing their tax record from



- their county appraisal district website. The required form (form 50-284) is available from the Texas comptroller website.*
- xiv. *Personnel performance evaluation and probationary period*
 - xv. *Employment-related grievance*
 - xvi. *Additional DPS policies are found in HR publications HR-42 and HR-166, which should be received during DPS general agency orientation.*
- h) *Department Risk Management Program (Chapter 8)*
- i. *Comprehensive Department safety program*
 - ii. *Hazard communication (HAZCOM) program*
 - iii. *Fleet safety program*
 - iv. *Drug-free workplace policy*
 - v. *Workers' compensation*
 - vi. *Work-related exposure to infectious disease*
 - vii. *Reporting work-related injuries and infectious disease exposures*
- i) *Fiscal and Property Procedures (Chapter 10)*
- i. *Salary deductions, adjustments, and authorizations*
 - ii. *Hazardous duty and longevity pay*
- j) *Communications and Motor Vehicle Fleet Operations (Chapter 11)*
- i. *Telephone services*
 - ii. *As applicable, car radio protocol and operation*
 - iii. *Motorpool operations*
 - iv. *Fleet incident or accident*
- k) *Building Use and Energy Conservation (Chapter 16)*
- l) *Equal Employment Opportunity (Chapter 18)*
- m) *Records and Information Policies (Chapter 21)*
- n) *Austin Headquarters Operating Procedures (Chapter 22)*
- i. *This section is relevant to all employees who either work at Headquarters or travel to Austin for training, interviews, meetings, or other business. Facilities outside Austin will have additional local operating procedures.*
 - ii. *Vehicle operation (including 24 hour reserved parking)*
 - iii. *General employee information for the emergency evacuation of headquarters facilities*
 - iv. *Emergency first aid*
 - v. *Headquarters security plan*
- o) *Cyber Security (Chapter 25)*
- p) *Information Resource Policy (Chapter 26)*
- q) *Agency Contracts, Procurements & Enterprise Projects (Chapter 28); specifically, Use of Payment Card (P-card)*



6. Travel
 - a) *Forms and allowances*
 - b) *Credit cards (Travel and DART Card)*
 7. Overview of DPS Crime Laboratory
 - a) *General history of the DPS Crime Laboratory*
 - b) *Crime Laboratory Service (General Manual Chapter 20)*
 - c) *Crime Laboratory overview (within CLS – Scope and General Requirements chapters)*
 - d) *Organizational Charts*
 - e) *Management System Requirements (CLS chapter)*
 - f) *Laboratory Customer Handbook (CLS, Part II)*
 - i. *Laboratory Addresses*
 - ii. *Service Area Maps*
 8. Employment
 - a) *Employee Training Program (CLS chapter)*
 - b) *Performance Plan (General Manual Chapter 7)*
 - c) *Employee Career and Leadership Development (CLS chapter)*
 - d) *Conditions of Employment (CLS chapter)*
 - e) *Attire and Appearance (CLS – Conditions of Employment chapter)*
- B. Required Readings
1. Texas Department of Public Safety General Manual:
 - a) *Chapter 1 – General Provisions*
 - b) *Chapter 2 – Laws Controlling the Department of Public Safety*
 - c) *Chapter 3 – Organization and Administration*
 - d) *Chapter 4 – Objective, Mission, and Program*
 - e) *Chapter 5 – Doctrines, Policies, and Operating Procedures*
 - f) *Chapter 6 – Professional Conduct*
 - g) *Chapter 7 – Personnel Policies, Procedures, Benefits, and Records*
 - h) *Chapter 8 – Department Risk Management Program*
 - i) *Chapter 10 – Fiscal and Property Procedures*
 - j) *Chapter 11 – Communications and Motor Vehicle Fleet Operations*
 - k) *Chapter 16 – Building Use and Energy Conservation*
 - l) *Chapter 18 – Equal Employment Opportunity*
 - m) *Chapter 20 – Crime Laboratory Service*
 - n) *Chapter 21 – Records and Information Policies*
 - o) *Chapter 22 – Austin Headquarters Operating Procedures*



- p) *Chapter 25 – Cyber Security*
 - q) *Chapter 26 – Information Resource Policy*
 - r) *Chapter 28 – Agency Contracts, Procurements & Enterprise Projects*
 2. Texas Department of Public Safety Crime Laboratory Service Manual (CLS):
 - a) *Introduction, Scope chapter*
 - b) *Part I,*
 - i. *General Requirements*
 - ii. *Management System Requirements*
 - c) *Part II,*
 - i. *Introduction*
 - ii. *General Laboratory Information*
 - iii. *Appendix 1 – Laboratory Services*
 - d) *Part III,*
 - i. *Conditions of Employment*
 - ii. *Employee Career and Leadership Development*
 - iii. *Employee Wellness Program*
 - iv. *Employee Training Program*
 3. Texas Department of Public Safety Employment Discrimination Workbook for New State Employees (EEO-5)
 4. Texas Department of Public Safety Employee Handbook (HR-166)

3.3 Practice

A. Supervised Performance

1. Tour the assigned duty station facility including introductions, safety devices, SDS, hazards, security, and evacuation routes.
2. Discuss the mission, organization, and expectations for the job.
3. Review the CAPPS system with supervisor.
4. Review the Performance Plan with supervisor.
5. Review the use of phone system features.
6. If applicable, review vehicle use procedure and policy.
7. If applicable, complete the application for travel credit cards and/or procurement cards.
8. Complete the New Employee Orientation Packet (HR-26). The documents required in the New Employee Orientation Packet must be submitted to HR.

B. Independent Exercises

1. Complete EEO New Hire and Compliance Online Training.
2. Complete Documentation, Preservation, Disclosure of Evidence Online Training.
3. Complete SANS Securing the Human Security Awareness Online Training.



3.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



4 General Safety

Duration 1 to 2 days

Purpose To promote safety knowledge and a safe working environment within the DPS Crime Laboratory, to prevent and minimize injury and to comply with Federal and State safety laws

Prerequisite New Employee Orientation

4.1 Objectives

A. Theoretical

DPS Laboratory personnel face potential exposure to hazardous materials, chemicals, and/or biological specimens containing infectious agents. Safety responsibility begins with each individual and extends to the entire workplace. Safety requires a personal commitment with the desire for self-protection and for the protection of coworkers.

The trainee will become aware of the comprehensive safety program within the laboratory. The safety program includes four areas: administrative controls (policies, procedures, and training), engineering controls (such as ventilation and hoods), work practices (such as use of sharps disposal containers and autoclaving waste), and personal protective equipment (PPE) related to hazardous materials.

B. Practical

Following the completion of training the trainee will:

1. Be familiar with general laboratory safety principles and agency and laboratory policies.
2. Be familiar with different types of PPE and how to use each one.
3. Be aware of firearm evidence safety. Additional firearms training may be requested from the Firearms and Toolmarks Section.
4. Be familiar with the location and use of safety equipment (eyewash, shower, hoods, restraints, etc.), including how to check for functionality/expiration of products and recommended maintenance.
5. Be able to locate fire warning devices, fire safety equipment, evacuchairs in multi-story laboratories, and building exits specific to the work area, and know how to respond to the device signal.
6. Identify the location of any laboratory duress buttons.
7. Be familiar with emergency procedures and designated safe meeting location(s).
8. Acknowledge that they have been informed of Right to Know information.
9. Be able to interpret labels, use a safety data sheet (SDS) and locate SDSs from local SDS collections and online SDS sites.
10. Be familiar with proper separation and storage of chemicals and spill response procedures.
11. Be familiar with standard precautions/Universal Blood Precautions and sharps safety protocol.
12. Identify the laboratory's Safety Advisor(s).



4.2 Training Outline

A. Lesson Plan

1. Administrative Controls
 - a) *Safety philosophy, scope, and responsibility (DPS General Manual Chapter 8)*
 - b) *Chemical Hazards – (SAF-03-01, Chemical inventory for local laboratory)*
 - c) *Hazardous Communication Program (SAF-03-02) [NOTE: It is not necessary to read every SDS the laboratory has; however, every person handling chemicals should be aware of the location of the SDS and know in what situations it would be appropriate to consult the SDS.]*
 - d) *Chemical container labels*
 - i. *United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and GHS Safety Data Sheets (SDS)*
 - ii. *NFPA panel (Diamond-shaped sign)*
 - iii. *HMIS bar (Review HMIS Safety Symbols)*
 - e) *Biological hazards (universal precautions, Hepatitis B vaccination) (SAF-04-01)*
 - f) *Emergency response (chemical, biological, mercury spills and gas leaks, bomb threats, evacuation plans) (SAF-05-02 to SAF-05-05, General Manual Chapter 5)*
 - g) *Routine safety inspections (SAF-06-01 and LAB-SAF-01)*
 - h) *Firearms safety (SAF-01-06)*
2. Engineering controls, location in lab, and proper use as applicable
 - a) *Laboratory design (evacuation routes, isolation of hazards)*
 - b) *Fire detection and warning devices (includes location of all devices in the laboratory, evacuation routes, and meeting places during fire drills)*
 - c) *Chemical and Biological hoods (SAF-01-05)*
 - d) *Chemical storage (SAF-03-01)*
 - e) *Gas cylinder restraint (SAF-01-07)*
 - f) *Cryogenics safety (conditional – job function dependent; SAF-01-07)*
 - g) *Radiation safety (SAF-02-01) (conditional – job function dependent)*
 - h) *Eyewash/Emergency shower (SAF-01-04)*
 - i) *Duress buttons*
 - j) *Naloxone Nasal Spray kits*
3. Work practices
 - a) *General housekeeping (SAF-01-01)*
 - b) *Chemical/Biological safety (SAF-01-01)*
 - c) *Personal Hygiene (SAF-01-01)*
 - d) *Handling sharps (SAF-04-01)*
 - e) *Waste treatment (autoclaves, incinerators) (SAF-04-01)*
4. Personal Protective Equipment (PPE) (SAF-01-02)



B. Required Readings

1. Texas Department of Public Safety General Manual:
 - a) *Chapter 5 Doctrines, Policies, and Operating Procedures*
 - i. *Sec. 05.83.00 Evacuation Plans for Department Occupied Facilities*
 - ii. *Sec. 05.84.00 Response to Bomb Threats*
 - iii. *Sec. 05.85.00 Using a Fire Extinguisher*
 - b) *Chapter 8 Department Risk Management Program*
 - i. *Sec. 08.02.00, Subsection 02.11 Safety Practices Policy*
 - ii. *Sec. 08.03.00 Hazard Communication (HAZCOM) Program*
 - iii. *Sec. 08.03.04 Labels*
 - iv. *Sec. 08.03.00, Subsection 03.05 Material Safety Data Sheet MSDS*
 - v. *Sec. 08.03.00, Subsection 03.03 Workplace Chemical List*
 - vi. *Sec. 08.10.00 Work-Related Exposure to Infections Disease*
 - vii. *Sec. 08.10.00, Subsection 10.04 Information on AIDS*
 - viii. *Sec. 08.11.00 Guidelines for Payment of Expenses Associated with Exposure to Infections Disease*
 - ix. *Sec. 08.12.00 Reporting Work-Related Injuries and Infections Disease Exposures*
 - c) *Chapter 13 Emergency and Disaster Functions*
2. Chemical inventory for local laboratory
3. Texas DPS Crime Laboratory Safety Manual

4.3 Practice

A. Independent Exercises

1. Complete Workplace Safety Exercise (LAB-GLT-06).
2. OSHA's Bloodborne Pathogens Standard requires that employers offer the hepatitis B vaccination series to any employee who is reasonably anticipated to have exposure to blood or other potentially infectious materials. The offer must be made within 10 days of employment and at no cost to the employee.
 - a) *Alternatively, the employee may elect to complete the Hepatitis B Vaccination Declination form (LAB-SAF-02)). An employee who declines the vaccine may change their decision and request the vaccine at any time.*
 - b) *Documentation of receiving or declining the vaccine is a medical record and should not be included in the notebook. The checklist entry should only indicate the date discussed.*
3. Complete the online Narcan Administration Training.
4. Complete the online Bloodborne Pathogens Training.



5. Observe safety videos that will be assigned by the trainer. Topics may include, but are not limited to: Chemical safety, Biological safety, Compressed gas, Confined spaces, Heavy lifting procedures, Spill clean-up procedures, Proper syringe handling
 - a) *These videos may be viewed at a later date during the annual laboratory safety training.*
 - b) *Training videos are available from the Texas Department of Health Audiovisual Library and from the TXDPS Training Academy Library.*
- B. Optional Exercise: General Safety Exercise (LAB-GLT-07)

4.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



5 Forensic Science

Duration 2 to 3 days

Purpose To acquaint or refresh the trainee with a brief overview of the disciplines of forensic science.

Prerequisite New Employee Orientation

5.1 Objectives

A. Theoretical

Understanding the field of forensic science is fundamental to crime laboratory personnel who have routine access to case records, evidence, laboratory analysis areas, and storage areas. Crime laboratory personnel must understand the principles of forensic science and the application of science to the laws that govern society. Crime laboratory personnel are an integral part of the criminal justice system which enforces these laws.

The trainee will become familiar with the definition, basic premises, and scope of forensic science, and the roles of the forensic scientist and other laboratory personnel.

B. Practical

Following the completion of training the trainee will:

1. Be able to define forensic science.
2. Be familiar with the roles of the forensic scientist and other laboratory personnel.
3. Be familiar with the forensic historical point of view: the individuals and their specific contributions to formulating the disciplines that now constitute forensic science.
4. Be familiar with the major disciplines in forensic science and within the Texas DPS Crime Laboratory Service.
5. Be familiar with the definition of physical evidence and common types of physical evidence examined.
6. Be familiar with the concepts of evidence integrity and chain of custody.
7. Be aware of the variety of potential evidentiary value from any evidence item as well as the priority order that a discipline section should receive it for analysis, based upon the impact of various discipline testing techniques.
8. Be aware of and know how to evaluate any hazardous attributes of evidence items.

5.2 Training Outline

A. Lesson Plan

1. Introduction to Forensic Science (Saferstein, Ch 1)
 - a) *Definition and scope of forensic science*
 - b) *History and development of forensic science*
 - c) *Organization of a crime laboratory (models)*
 - d) *Services of a crime laboratory*
 - e) *Functions of the forensic scientist*



- f) *Locard's transfer/exchange principle*
- g) *Conclusions - assessing the strength of the evidence*
2. Definitions glossary (CLS – *Terms and Definitions*)
3. Review of Laboratory Services
 - a) *Statement of services (CLS – Laboratory Terms of Service)*
 - i. *DPS Laboratory customers*
 - ii. *Contract with customer*
 - b) *Scope of forensic testing services (CLS – Laboratory Service Requests), including Laboratory Customer Handbook chapters:*
 - i. *AFIS and Friction Ridge Examination*
 - ii. *Biology/DNA Analysis*
 - iii. *Forensic Document Examination and Digital/Multimedia Analysis*
 - iv. *Firearms & Toolmarks Analysis*
 - v. *Seized Drugs Analysis*
 - vi. *Toxicology (Alcohol/Volatiles and/or Drugs) Analysis*
 - vii. *Trace Evidence Analysis*
 - c) *Scope of Breath Alcohol Calibration services (www.dps.texas.gov/BalLab)*
 - i. *Instrument Calibration*
 - ii. *Certified Reference Material (CRM) Calibration*
 - d) *Statement of Quality Policy (CLS – Scope)*
4. Common types of physical evidence and conditions detrimental to evidence
 - a) *Biological specimens [heat, intense light, mold, leaky containers leading to cross contamination or loss including evaporation of volatiles, introduction of chemicals including fingerprint powders/sprays that interfere with DNA, careless handling which obliterates or contaminates DNA]*
 - b) *Chemicals [heat, leaky containers leading to cross contamination or loss including evaporation of volatiles]*
 - c) *Botanicals [mold, obliteration of microscopic evidence, introduction of artifacts]*
 - d) *Weapons/ammunition [obliteration of marks in soft metal]*
 - e) *Surfaces [careless handling which obliterates or contaminates DNA, obliterates fingerprints or microscopic evidence, or introduces artifacts]*
 - f) *Documents [obliteration of impressions and latent prints, introduction of artifacts, damage to fragile evidence]*
 - g) *Digital/multimedia evidence [large temperature and humidity variations, electric static, magnetic fields, damage to fragile evidence, residues which inhibit device operation, obliteration of latent prints, introduction of artifacts. Possible deleterious effects to data if the computer is improperly shut down/unplugged (before seizure) or booted (turned on) after seizure and before submission to the laboratory]*



- h) *Impressions and Toolmarks [obliteration of marks in paper, soft metal, wood, dirt, snow, etc., introduction of randomly acquired characteristics]*
 - i) *Fibers, glass, hair, paint, soil [obliteration of microscopic evidence introduction of artifacts]*
 - j) *Stains and residues on clothing and other objects [chemicals that include latent print powders/sprays which interfere with DNA, handling which obliterates or contaminates DNA, obliteration of microscopic evidence, introduction of artifacts]*
 - k) *Combinations of evidence [e.g., an article of clothing with biological, fiber, glass, and hair evidence or a gun with biological evidence and gunshot primer residue]*
5. Significance of physical evidence
- a) *Identification*
 - b) *Comparison*
 - i. *Class characteristics (classification)*
 - ii. *Individual characteristics (individualization) elimination and inclusion*
 - c) *Location*
6. Responsibilities of the crime laboratory for evidence integrity (ISO/IEC 17025 and Accreditation Requirements; CLS chapters – *Process Requirements*, *Handling of Test or Calibration Items section*, and *Evidence and Database Sample Integrity*)
- a) *Prevention of loss, contamination, and changes in quality during collection, packaging, testing, and storage across all of the disciplines and other agencies (CLS – Evidence and Database Sample Integrity)*
 - i. *Spoilation (willful destruction of evidence or the failure to preserve potential evidence for another's use in pending or future litigation) of scene and evidence*
 - ii. *Evidentiary value and order of collection/testing*
 - 1. ***Discussion of probative value as evidence for each discipline***
 - 2. ***Discussion of the evidence's significance to the case with law enforcement investigators***
 - iii. *Precautions to be taken during evidence searches and analyses*
 - 1. ***Single case/sample handling***
 - 2. ***Separating evidence from reference samples***
 - 3. ***Preparing work surface areas***
 - 4. ***Frequent glove changes***
 - 5. ***Cleansing tweezers, scissors and tools***
 - b) *Collection, packaging, testing, and storage procedures to preserve and prevent further deterioration (CLS – Evidence Processing and General Evidence Collection Guidelines and Packaging Requirements)*
 - i. *General instructions*
 - ii. *Biological evidence*
 - 1. ***Storage temperature***
 - 2. ***Drying***
 - 3. ***Isolation***



- iii. *Botanical evidence*
 - 1. **Drying**
 - 2. **Combustion risk**
 - 3. **Spontaneous combustion of moisture-containing bales**
 - 4. **Evidence soaked with a volatile liquid**
- iv. *Digital/multimedia evidence*
- v. *Document evidence*
- c) *Proper evidence seals (see definition for “proper seal” in CLS – Terms and Definitions)*
- d) *Maintain intact chain of custody (ISO/IEC 17025 and AR 3125)*
- e) *Evidence Quality*

B. Required Readings

1. Texas Department of Public Safety Crime Laboratory Service Manual (CLS):
 - a) *Introduction, Scope, Statement of Quality Policy* section
 - b) *Part I,*
 - i. *Terms and Definitions*
 - ii. *Process Requirements (Standard 7 – 17025), Handling of Test or Calibration Items* section
 - c) *Part II,*
 - i. *Laboratory Terms of Service*
 - ii. *Laboratory Service Requests*
 - iii. *AFIS*
 - iv. *Biology/DNA Analysis*
 - v. *CODIS DNA Procedural Guidelines*
 - vi. *Digital/Multimedia Analysis*
 - vii. *Firearms & Toolmarks Analysis*
 - viii. *Forensic Document Examination*
 - ix. *Friction Ridge Examination*
 - x. *Seized Drugs Analysis*
 - xi. *Toxicology (Alcohol/Volatiles and/or Drugs) Analysis*
 - xii. *Trace Evidence Analysis*
 - d) *Part IV,*
 - i. *Evidence and Database Sample Integrity*
 - ii. *Evidence Processing*
2. Saferstein, R. *Criminalistics: An Introduction to Forensic Science*; Prentice Hall (Use of most recent publication is recommended).
 - a) *Chapter 1 – Introduction*
 - b) *Chapter 3 – Physical Evidence*



3. Technical Working Group on Biological Evidence Preservation. *The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers*. NISTIR 7928; National Institute of Standards and Technology (NIST) U.S. Department of Commerce: 2013.
4. International Organization for Standardization/International Electrotechnical Commission (ISO/IEC). *ISO/IEC 17025:2017 – Standard 7.4 Handling of Test or Calibration Items*
5. ANSI National Accreditation Board. *Forensic Science Testing and Calibration Laboratories: Accreditation Requirements. AR 3125; ANAB: 2019. Standard 7.4.1.1*

5.3 Practice

None

5.4 Assessment

The trainer may opt for the trainee to complete a written exam.



6 Forensic Testing Laboratory Information Management Systems (LIMS)

Duration 1/2 to 1 day

Purpose To familiarize the trainee with the LIMS utilized in the Crime Laboratory for forensic testing.

Prerequisite New Employee Orientation, General Safety, Forensic Science

6.1 Objectives

A. Theoretical

Following the completion of this module, the trainee will have an understanding of the history and development of the laboratory's forensic testing LIMS. This module is specific to forensic testing disciplines.

For CODIS and Breath Alcohol personnel, completion of this module is optional. Please refer to the respective discipline training manual for more in depth information.

B. Practical

Following the completion of this module, the trainee will become familiar with the applicable LIMS with regard to its utility for evidence tracking and documentation, including barcoding, documentation of sub-evidence exhibits, inventory, and inter/intra-laboratory transfers of evidence.

6.2 Training Outline

A. Lesson Plan

1. DPS Reporting and Gathering Network (DRAGNet)
 - a) *Individual to each laboratory, so the same evidence could have multiple case numbers if it was transferred to other labs.*
 - b) *Case numbers began with "L" [DPS Region #] and then the first letter of the city of the laboratory for example: L-123456 (Austin), L1T-123456 (Tyler), and L3M-123456 (McAllen).*
 - c) *Reports were printed and mailed.*
2. Justice Trax LIMS-Plus
 - a) *Implemented in February 2012*
 - b) *Case numbers generally have a three character alpha prefix corresponding to the lab's location followed by a dash, and then the two digit year and the two digit month, a dash, and then a five digit number that begins at 00001 each year. For example, WAC-1801-00002 is the second case received in January of 2018 at the Waco Lab.*
 - c) *Reports are automatically emailed after the report has been administratively reviewed and stored electronically. Reports may be automatically sent to multiple recipients.*
3. STaCs (Sample Tracking and Control Software) is the current LIMS used in the CODIS databasing laboratory.
4. COBRA (Computerized Online BReath Archive) is the current LIMS used in the Breath Alcohol Laboratory.



5. LIMSUtilities is the application utilized for the creation, maintenance and records storage of Crime Laboratory personnel statement of qualifications and disclosure forms.

B. Required Readings

1. Texas Department of Public Safety Crime Laboratory Service Manual (CLS), Part IV,
 - a) *Evidence and Database Sample Integrity – Chain of Custody section*
 - b) *Laboratory Equipment – Laboratory Software section*
 - c) *Laboratory Records*
 - d) *Laboratory Reports, Letters, and Certificates*
2. Laboratory Information Management System (LIMS) Manual

6.3 Practice

A. Supervised Performance

To be executed in JusticeTrax LIMS-Plus:

1. Introduction
 - a) *Log On*
 - b) *Change Password and PIN*
 - c) *LIMS Manual*
 - d) *Looking Up a case*
 - i. *By Case #*
 - ii. *By Agency #*
 - iii. *By Person/Using sound-alike search*
 - iv. *By Barcode*
2. Case Info Tab
 - a) *View, Create, and Edit Case Activities*
 - b) *Create/edit a case message*
 - c) *Access the Main Case Report*
 - d) *Access the Case COC Report*
3. Agency Tab
 - a) *Understand that multiple agencies can be present on the same case*
 - b) *Add/edit agencies and agency case numbers*
4. Offense Tab
 - a) *Use of offense codes*
 - b) *County of offense may be related to routing of reports*
 - c) *Add/edit offenses*
 - d) *Multiple offenses may be present on the same case*



5. Individuals Tab
 - a) *Three types of individuals (suspect, victim, and elimination)*
 - b) *Add/edit individuals to include state ID number and Driver's License Number*
6. Evidence Tab
 - a) *Checking Chain of Custody*
 - b) *Checking Evidence Locations*
 - c) *Generating Evidence Barcode*
 - d) *Editing Evidence Descriptions*
 - e) *Understand how to change the evidence Hierarchy Views*
 - f) *Adding an evidence container to an existing case*
7. Request Tab
 - a) *Change request type*
 - b) *Relating People and Evidence to a request*
 - c) *Viewing and setting milestones*
 - d) *Viewing/printing reports*
8. General
 - a) *Understand how cases are assigned*
 - b) *View the Workload and Requests Report*
 - c) *Access Crystal Reports*
 - i. *Evidence Inventory Report*
 - ii. *Activity Reports*
 - d) *Add agency representatives*
 - e) *Transfer evidence/folders*
 - f) *Upload and view images in the Imaging Module*

B. Independent Exercises

The trainee will demonstrate knowledge by the completion of a practical exercise that will incorporate at a minimum the following:

1. Searching for a case by individual name, agency case number, and laboratory case number
2. Accessing the chain of custody for a particular item
3. Transferring an item through the use of a barcode and PIN

6.4 Assessment

The trainer may opt for the trainee to complete a written exam.



7 Evidence Handling

Duration 2 to 3 days

Purpose To familiarize the trainee with the concepts and practices of evidence integrity, security, proper seals, thorough documentation, and chain of custody.

Prerequisite New Employee Orientation, General Safety, Forensic Science, Forensic Testing LIMS

7.1 Objectives

A. Theoretical

Evidence integrity and an intact chain of custody are crucial factors for the admissibility of evidence in a court of law. Comprehensive record keeping and documentation of evidence tracking within the laboratory are essential to good forensic laboratory practices. The precautions taken to prevent contamination, loss and deleterious change to evidence are of utmost importance during storage and examinations. It is critical for all laboratory personnel who come in contact with evidence in any capacity recognize and preserve its potential evidentiary value for all disciplines.

For CODIS and Breath Alcohol personnel, completion of this module is optional.

B. Practical

Following the completion of training, the trainee will be familiar with:

1. The concept of the security of evidence in the laboratory, by means of limiting access, secure storage lockers and evidence seals.
2. Proper techniques of sealing evidence, marking for identification and individual packaging of items.
3. Documentation for receiving and returning evidence.
4. The authorization required for the destruction of evidence.
5. The distinction between long-term and short-term storage.
6. Precautions taken to prevent contamination during evidence handling.

7.2 Training Outline

A. Lesson Plan

1. Evidence submission and receipt
 - a) *Laboratory Customer Handbook (CLS, Part II)*
 - b) *Case/Calibration Record (CLS– Laboratory Records)*
 - c) *Evidence Control (CLS – Evidence and Database Sample Integrity and Evidence Processing)*
 - d) *Instructions for Evidence Received by Email (CLS – Submission and Receipt of Evidence, Receipt Procedure – General section)*
 - e) *Methods of submission: in person, commercial courier, U.S. postal service, deposits to secure lockbox.*
 - f) *Evaluation of submission form information, including whether it is a new case, resubmission, or additional evidence*



- c) *Documentation (case record, incinerator weight log, destruction list)*
- d) *Computer data entry, barcoding (return, court, destruction, etc.)*
- e) *Submission of evidence into court (examiner brings evidence to court and the evidence is introduced into court and retained by court)*
- f) *Long term storage in the laboratory (evidence submitted by DPS law enforcement)*

8. Safety

Personal Protective Equipment such as safety glasses, goggles, lab coat, gloves, and mask may be required when receiving or working with evidence, particularly those creating an aerosol and those that are biological or chemical hazards.

B. Required Readings

- 1. Texas Department of Public Safety Crime Laboratory Service Manual (CLS):
 - a) *Part II: Laboratory Customer Handbook*
 - b) *Part IV,*
 - i. *Submission and Receipt of Evidence*
 - ii. *Evidence and Database Sample Integrity*
 - iii. *Evidence Processing*
 - iv. *Return of Evidence*
 - v. *Destruction of Evidence*
 - vi. *Laboratory Records*
 - c) *Laboratory Forms*
 - i. *LAB-201 Laboratory Submission Form*
 - ii. *LAB-202 Seized Drugs Destruction Only Submission Form*
 - iii. *LAB-203 Toxicology Request Submission Form*
 - iv. *LAB-206 Sexual Assault Evidence Submission Certification Form*
 - v. *LAB-211 Gunshot Residue Kit Information Form*
 - vi. *LAB-213 Expedited Analysis / Reanalysis Request Form*
 - vii. *LAB-403 Laboratory Information Sheet*
 - viii. *LAB-404 Laboratory Information Sheet Landscape*
- 2. Koehler, D. J. *Evidence Handling Procedures* [PowerPoint presentation]. Texas Forensic Science Commission.

7.3 Practice

A. Observed Performance

- 1. The trainee will observe evidence coordination personnel receiving evidence from submitting agency, returning evidence to submitting agency, and transferring evidence to different sections of the laboratory.
- 2. The trainee will observe analysts opening, examining, marking, sealing and storing evidence in different sections of the laboratory.



3. The trainer will discuss all types of evidence and the security of evidence, limited access, evidence seals, secure storage locations, and proper storage conditions.

B. Supervised Performance

The trainee will demonstrate proper sealing of an envelope, paper bag, and cardboard box.

7.4 Assessment

- A. The trainee must complete all assignments, except those noted as optional for CODIS and Breath Alcohol. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



8 Ethics and Professionalism

Duration ½ to 1 day

Purpose To familiarize the trainee with the policies and ethics statements of the State of Texas, Texas DPS, Texas Forensic Science Commission, and ANAB

Prerequisite New Employee Orientation, Forensic Science

8.1 Objectives

A. Theoretical

Ethical decisions and behavior as a DPS Crime Laboratory employee are critical to the credibility and functionality of the whole laboratory. The trainee will review the policies and ethics statements of the State of Texas, Texas DPS, and the ANAB accrediting body.

Cognitive Bias is a systematic error in thinking that affects the decisions and judgments that are made. The forensic community has taken steps in addressing the potential for bias and approaches for minimizing cognitive bias in forensic work.

B. Practical

Following the completion of training the trainee will:

1. Engage in interactive forensic science scenarios
2. Be familiar with the DPS Ten General Orders
3. Be familiar with the five standards of conduct for the State of Texas employees
4. Be familiar with guidelines to job success
5. Be familiar with sources of bias and how to manage the risk

8.2 Training Outline

A. Lesson Plan

1. Ethical Codes of Organizations and Entities
 - a) *Ethics Laws for Texas State Officers and Employees*
 - i. *Part I: Standards of Conduct and Conflict of Interest*
 - ii. *Perjury and Other Falsification, Texas Penal Code Ch 37*
 1. **Definitions: Perjury, Aggravated Perjury**
 2. **Tampering with Governmental Record**
 - b) *Texas DPS Policies*
 - i. *General Manual*
 1. **DPS Honor Code – 05.108**
 2. **DPS Ten General Orders – 06.10.00**
 3. **Standards of Conduct – 06.20.02**
 - ii. *CLS Manual*
 1. **Laboratory personnel (CLS– Laboratory Code of Ethics)**
 2. **Conflict of interest and constraints (CLS – Laboratory Code of Ethics, ANAB Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel section)**
 3. **Quality Policy Statement (CLS – Scope)**



- c) *ANSI National Accreditation Board Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel*
 - d) *Texas Forensic Science Commission Code of Professional Responsibility for Forensic Analysts and Crime Laboratory Management*
2. Cognitive Bias
- a) *Human information processing*
 - b) *Understand and manage “risk”*
 - c) *Bias*
 - i. *Confirmation bias*
 - ii. *Hindsight bias*
 - iii. *Saliency/Availability bias*
 - iv. *Overconfidence bias*
 - d) *Sources of bias*
 - i. *Case evidence*
 - ii. *Reference materials*
 - iii. *Irrelevant case information*
 - iv. *Base rate expectations*
 - v. *Organizational factors*
 - vi. *Training and motivation*
 - vii. *Cognitive architecture and the Brain*
3. Licensure
- B. Required Readings
- 1. Texas Penal Code, Title 8, Chapter 37 – Purjury and Other Falsifications
 - 2. Texas Department of Public Safety General Manual:
 - a) *Chapter 5, Sec. 05.108.00 – DPS Honor Code*
 - b) *Chapter 6 – Professional Conduct*
 - i. *Sec. 06.10.00 – DPS Ten General Orders*
 - ii. *Sec. 06.20.00, Subsection 20.02 – Standards of Conduct*
 - 3. ANSI National Accreditation Board. *Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel*. GD 3150. ANAB: 2018.
 - 4. National Commission on Forensic Science. *National Code of Ethics and Professional Responsibility for the Forensic Sciences*. National Institute of Standards and Technology (NIST) U.S. Department of Commerce.
 - 5. Texas Administrative Code, Title 37, Part 15, Chapter 651, Subchapter C, Rule §651.219 – Code of Professional Responsibility for Forensic Analysts and Crime Laboratory Management Subject to the Jurisdiction of the Texas Forensic Science Commission.



6. Texas Ethics Commission. *A Guide to Ethics Laws for State Officers and Employees*. State of Texas: 2015
7. Committee on Identifying the Needs of the Forensic Sciences Community, National Research Council. *Strengthening Forensic Science in the United States: A Path Forward*. Summary Prepublication Copy. Document No. 228091. National Academic Press: Washington, DC: 2009.
8. Upshaw Downs, J. C., Swienton A. R., Eds. *Ethics in Forensic Science*.; Elsevier: Waltham, MA, 2012.
 - a) *Chapter 3 – General Forensic Ethical Dilemmas, pp 59-79*
 - b) *Chapter 13 – Ethics in Testimony, pp 343-376*
9. Ex parte Coty, No. WR-79318-02, 2014 WL 128002, at *1 (Tex. Crim. App. Jan. 15, 2014).
10. Johnson-Liu, E. Ex Parte Coty and the Fallout from an Unethical Lab Tech. *Texas District & County Attorneys Association*, 2014.
11. Thompson, W. C. Beyond bad apples: Analyzing the Role of Forensic Science in Wrongful Convictions. *S. U. L. Rev.* 2008, 37, pp 971-994.
12. Government Code, Title 5, Subtitle A, Chapter 554 – Protection for Reporting Violations of Law.
13. Yadav, P. K. Ethical Issues Across Different Fields of Forensic Science. *Egypt J Forensic Sci*, 2017, 7(1): 10. doi: 10.1186/s41935-017-0010-1.
14. Budowle, B., et al. A Perspective on Errors, Bias, and Interpretation in the Forensic Sciences and Direction for Continuing Advancement. *J Forensic Sci.* 2009, 54 (4), pp 798-809. doi: 10.1111/j.1556-4029.2009.01081.x.
15. Dror, I. E. Cognitive Neuroscience in Forensic Science: Understanding and Utilizing the Human Element. *Philos Trans R Soc Lond B Biol Sci.* 2015, 370 (1674): 20140255. doi: 10.1098/rstb.2014.0255.
16. Dror, I. E., et al. Context Management Toolbox: A Linear Sequential Unmasking (LSU) Approach for Minimizing Cognitive Bias in Forensic Decision Making. *J Forensic Sci.* 2015, 60 (4), pp 1111-1112. doi: 10.1111/1556-4029.12805.
17. National Commission on Forensic Science. *Ensuring that Forensic Analysis is Based Upon Task-Relevant Information*. National Institute of Standards and Technology (NIST). U.S. Department of Commerce.
18. Jeanguenat, A.; Budowle, B.; Dror, I. E. Strengthening Forensic DNA Decision Making Through a Better Understanding of the Influence of Cognitive Bias. *Sci Justice*, 2017, 57 (6), pp 415-420. doi: 10.1016/j.scijus.2017.07.005.
19. Thompson, W. C. What Role Should Investigative Facts Play in the Evaluation of Scientific Evidence? *Australian Journal of Forensic Sciences*, 2011, 43 (2–3), pp 123–134. doi: 10.1080/00450618.2010.541499.

8.3 Practice

None



8.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



9 Introduction to Quality Assurance

Duration 1 to 2 days

Purpose To familiarize trainee with the principles of quality assurance as they apply to forensic science

Prerequisite New Employee Orientation, Forensic Science, Ethics and Professionalism

9.1 Objectives

A. Theoretical

The ability to understand and apply proper quality assurance practices is essential to the process of forensic analysis. Analysts must have a knowledge of forensic advisory boards, scientific/technical working groups, and other governing bodies from local to national levels. The development, coordination and maintenance of reliable, uniform and scientifically sound laboratory procedures are dependent upon a solid quality assurance program. Formal methods of quality assurance ensure compliance with accreditation standards.

B. Practical

Following the completion of training the trainee will:

1. Understand the basic principles of quality assurance.
2. Be familiar with the legal mandate for accreditation and oversight.
3. Be familiar with the accreditation process.
4. Be familiar with the elements involved in system quality processes, demonstrating lab competence, and assessing individual competence.
5. Be familiar with root cause analysis and process improvement.
6. Be familiar with professional associations which offer guidance/standards for analysis and training.

9.2 Training Outline

A. Lesson Plan

1. Definitions

- a) *Quality: Suitability for use; the degree to which a set of inherent characteristics fulfills requirements*
- b) *Quality Assurance (QA): Planned or systematic actions necessary to provide adequate confidence that the results from laboratory analyses and testing satisfy given requirements for quality*
- c) *Quality Control (QC): The day-to-day operational techniques and activities used by the laboratory to consistently provide accurate results that fulfill the requirements for quality*
- d) *Quality Manager (QM): An individual designated by top management who, irrespective of other responsibilities or however titled, has the defined authority and obligation to ensure that the requirements of the quality system are implemented and maintained*
- e) *System Quality Manager (SQM): An individual designated as top management and responsible for the Crime Laboratory Service Quality Assurance program.*



- f) *Quality Manual: The CLS Manual is considered to be the quality manual for the laboratory. It contains laboratory policies and defines quality processes/practices.*
 - g) *Quality Policy: The overall intentions and direction of an organization related to quality as formally expressed by top management*
 - h) *Quality Objectives: The goals sought or aimed for, which are related to quality, generally based on the organization's quality policy and generally specified for relevant functions and levels in the organization*
 - i) *Competency Test: The evaluation of a person's knowledge, skills, and/or ability to perform work.*
 - j) *Proficiency Testing: Evaluation of participant performance against pre-established criteria by means of interlaboratory comparisons.*
 - k) *Interlaboratory Comparison: Organization, performance, and evaluation of measurements or tests on the same or similar items by two or more laboratories in accordance with predetermined conditions.*
 - l) *Intralaboratory Comparison: Organization, performance, and evaluation of measurements or tests on the same or similar items within the same laboratory, in accordance with predetermined conditions.*
 - m) *Accreditation: The independent evaluation and certification by a recognized accrediting body to carry out specific activities to ensure their impartiality, competence and conformance to established standards. The Crime Laboratory Accreditation Process can be found in the Texas Code of Criminal Procedure, Article 38.01.*
2. Basic principles of quality assurance
- a) *Fit for Purpose*
 - i. *Appropriate resources*
 - ii. *Examiner evaluation*
 - b) *Right the First Time*
 - i. *Process improvement*
 - ii. *Management system evaluation*
 - c) *Feedback mechanisms*
3. Legal mandate and oversight
- a) *Texas Code of Criminal Procedure, Article 38.01*
 - b) *Texas Code of Criminal Procedure, Article 38.35*
4. Accreditation process
- a) *Accreditation*
 - b) *Audits*
 - c) *Inspections*
5. Laboratory Quality Processes
- a) *Management System*
 - i. *DPS Statement of Quality Policy (CLS Manual – Scope)*



- ii. *Quality Management System responsibilities*
 - 1. **Management System Requirements (CLS chapter),**
 - 2. **Advisory Boards and Laboratory Committees (CLS chapter)**
 - iii. *Accreditation*
 - iv. *Approved suppliers (CLS Manual – Externally Provided Products and Services)*
 - v. *Document management (CLS Manual – Document Management and Deviation):*

The QA section ensures that current versions of documents are authorized by the Director and available electronically.
 - vi. *Case record and laboratory case reports (CLS Manual – Laboratory Records and Laboratory Reports, Letters, and Certificates chapters) [testing]*
 - vii. *Breath Alcohol calibration record (OSD Manual – Standard Operating Procedures: Evidential Breath Alcohol Instrument Calibration) [calibration]*
 - viii. *Review process (CLS Manual – Review of Laboratory Records)*
 - 1. **Technical**
 - 2. **Administrative**
 - 3. **Examination verification**
 - ix. *Management of records (CLS Manual – Electronic Storage and Archival of Records)*
- b) *Laboratory Competence*
- i. *Audits and inspections (CLS Manual – Audits)*
 - ii. *Laboratory Management System Surveys (CLS Manual) : formal evaluation of existing processes*
 - iii. *Validations of equipment and methods are performed before placing them into service or general practice (CLS Manual – Validations and Performance Verifications)*
 - iv. *Calibration and performance verification (CLS Manual – Laboratory Equipment; Externally Provided Products and Services; Standards, Reference Materials/Collections, Databases, and Controls; and Validations and Performance Verifications chapters)*
 - 1. **Equipment includes instruments, software, and reagents**
 - 2. **Reference standards, materials/collections, databases, and controls**
- c) *Individual Competence*
- i. *Training and competency (CLS Manual – Employee Training Program and Work Authorization chapters)*
 - 1. **Work authorization**
 - 2. **Employee career and leadership development**
 - 3. **Continuing education**
 - 4. **Literature review**
 - ii. *Examiner assessment (CLS Manual – Monitoring the Validity of Results)*
 - iii. *Testimony monitoring and technical review (CLS Manual – Court Testimony and Monitoring)*
6. *Root cause analysis and process improvement (CLS Manual – Process Requirements; Employee Training Program; Customer Feedback – Surveys and*



Complaints; Preventive Actions; and Quality Incident (QI) and Quality Action Plan Process (QAP) chapters)

- a) *Root Cause Analysis*
 - i. *Directive Recommendation: Root Cause Analysis (RCA) in Forensic Science from the National Commission on Forensic Science*
 - ii. *Risk, Reward, and Redemption: Root Cause Analysis in Forensic Organizations*
 - iii. *Root Cause Analysis (presentation from the Texas Forensic Science Commission)*
 - b) *Non-Conforming work and corrective action (CLS)*
 - c) *Preventive action (CLS)*
7. The following is a list of national and international quality, scientific and technical working groups of experts who offer guidance/standards for analysis and training. Many of the organizations offer specific guidelines for casework examination.
- a) *AFQAM (Association of Forensic Quality Assurance Managers)*
 - b) *ASQ (American Society for Quality)*
 - c) *SWGDM / TWGDAM (DNA Analysis)*
 - d) *SWGDRUG (Seized Drugs)*
 - e) *SWGDMAT (Materials Analysis)*
 - f) *SWGTTREAD (Tire track and shoe prints)*
 - g) *SWGFAST (Friction Ridge Analysis, Study and Technology)*
 - h) *SWGGSR (Gunshot residue)*
 - i) *SWGGUN (Firearms and Toolmarks)*
 - j) *ABFDE (American Board of Forensic Document Examiners)*
 - k) *SWGDE (Digital Evidence for Computer Forensics and for Forensic Audio)*
 - l) *SWGIT (Imaging Technology)*
 - m) *SWGDOC (Forensic Document Examination)*
 - n) *SWGTOX (Forensic Toxicology)*
 - o) *SOFT (Society of Forensic Toxicologists)*
 - p) *NIST (National Institute of Standards and Technology)*
 - q) *ASTM (American Society for Testing and Materials)*
 - r) *OSAC (Organization of Scientific Area Committees)*

B. Required Readings/Presentations

1. Texas Department of Public Safety Crime Laboratory Service Manual (CLS):
 - a) *Introduction, – Scope – Statement of Quality Policy* section
 - b) *Part I,*
 - i. *Process Requirements*
 - ii. *Management System Requirements*



- c) *Part III,*
 - i. *Employee Training*
 - ii. *Work Authorization*
 - iii. *Monitoring the Validity of Results*
 - iv. *Court Testimony and Monitoring*
 - d) *Part IV,*
 - i. *Laboratory Equipment*
 - ii. *Externally Provided Products and Services*
 - iii. *Standards, Reference Materials/Collections, Databases, and Controls*
 - iv. *Validations and Performance Verifications*
 - v. *Laboratory Records*
 - vi. *Laboratory Records, Letters, and Certificates*
 - vii. *Review of Laboratory Records*
 - e) *Part V,*
 - i. *Customer Feedback – Surveys and Complaints*
 - ii. *Document Management and Deviation*
 - iii. *Electronic Storage and Archival of Records*
 - iv. *Advisory Boards and Laboratory Committees*
 - v. *Preventive Actions*
 - vi. *Quality Incident (QI) and Quality Action Plans (QAP)*
 - vii. *Risks, Opportunities, and Improvements*
 - viii. *Laboratory Management System Surveys*
 - ix. *Audits*
2. Texas Code of Criminal Procedure, Title 1, Chapter 38
 - a) *Art. 38.01 – Texas Forensic Science Commission*
 - b) *Art. 38.35 – Forensic Analysis of Evidence; Admissibility*
 3. ANSI National Accreditation Board. *ISO/IEC 17025:2017 - Forensic Science Testing and Calibration Laboratories: Accreditation Requirements*. AR 3125; ANAB: 2019.
 4. International Organization for Standardization/International Electrotechnical Commission (ISO/IEC). *General Requirements for the Competence of Testing and Calibration Laboratories*. ISO/IEC 17025:2017(E); ISO: Geneva, 2017.
 5. Respective Discipline SOPs
 6. Electronic Conformance Files
 7. Koehler, D. J. *Root Cause Analysis* [PowerPoint presentation]. Texas Forensic Science Commission



8. National Commission on Forensic Science. *Root Cause Analysis (RCA) in Forensic Science*. National Institute of Standards and Technology (NIST), US. Department of Justice.
9. Houck, Max M. "Risk, Reward, and Redemption: Root Cause Analysis in Forensic Organizations", *Forensic Science Policy & Management: An International Journal*, 7:3-4 (2016), pp. 106-112, DOI: 10.1080/19409044.2016.1224278

9.3 Practice

- A. Independent Exercises
 1. Complete a Statement of Qualifications
 2. Complete a Disclosure Form

9.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



10 Introduction to Records and Information Management

Duration 1 to 2 days

Purpose To familiarize trainee with the policies and procedures regarding laboratory records and information including management, retention, and release.

Prerequisite New Employee Orientation, Forensic Science, Ethics and Professionalism

10.1 Objectives

A. Theoretical

The trainee is introduced to the policies and responsibilities with regard to laboratory records and information management. Records and information management is the systematic control of all records from their creation or receipt, through their processing, distribution, organization, storage, and retrieval, to their ultimate disposition. Department employees must be familiar with their responsibilities regarding the creation, use, maintenance, preservation, retention, release, and destruction of State records for the purposes of managing cost, efficient access and retrieval, protection, and legal risk.

B. Practical

Following the completion of training the trainee will:

1. Understand the Department and laboratory records and information management and retention requirements and laws.
2. Be familiar with the records management process, designated Department and laboratory contacts and resources, and the Department records retention schedule.
3. Understand each employee's responsibilities regarding the management, retention, and release of records and information, including confidentiality and forensic disclosure.
4. Be familiar with the types of requests for laboratory records and information and the procedures for each type of release, including required documentation of the request and release.

10.2 Training Outline

A. Lesson Plan

1. Records and Information Policies (General Manual Chapter 21)
 - a) *Definitions*
 - i. *Official record*
 - ii. *Electronic records*
 - iii. *Record copy*
 - iv. *Convenience copy*
 - v. *Confidential record*
 - vi. *Retention period*
 - vii. *Disposition log*



- b) *Responsibilities*
 - i. *Records management officer (RMO)*
 - ii. *Records management liaison (RML)*
 - iii. *Department employees*
 - c) *Required Department records management training*
 - d) *Records retention schedule*
 - e) *Maintenance and disposition of records: Texas Government Code §441.187*
 - f) *Removal of records from Department custody violations*
 - i. *Texas Government Code §§441.191 - 441.192*
 - ii. *Texas Penal Code §37.10*
2. Documentation, Preservation and Disclosure of Evidence (General Manual Chapter 5): Texas Code of Criminal Procedure Article 39.14
 3. Forensic Disclosure and Compliance Policy (CLS Manual)
 4. Laboratory Records (CLS Manual)
 5. Expunction and Destruction of Laboratory Records and Information (CLS Manual)
 6. Electronic Storage and Archival of Records (CLS Manual)
- B. Records and Information Release
1. Records and Information Policies (General Manual Chapter 21)
 - a) *Media inquiries*
 - b) *Public information requests*
 - i. *Confidential information*
 - ii. *Excepted information*
 - iii. *Personal information*
 - iv. *Submission methods*
 2. Documentation, Preservation and Disclosure of Evidence (General Manual Chapter 5)
 3. Records Requests and Release of Laboratory Records and Information (CLS Manual)
 - a) *Encryption requirements (General Manual Chapter 26)*
 - b) *Public information requests*
 - i. *Emailed requests*
 - ii. *Exceptions to disclosure*
 - iii. *Fees and reimbursement*
 - c) *Subpoena duces tecum and court order requests*
 - d) *Motions and requests for discovery (Michael Morton Act)*
 - e) *Release of information pertaining to intoxication offenses*
 - f) *Release of CODIS records and information, including samples*



- g) *Execution and release of affidavits*
- h) *Documentation of records requests and releases*

C. Required Readings

1. Texas Department of Public Safety Crime Laboratory Service Manual (CLS):
 - a) *Part III, Forensic Disclosure and Compliance Policy*
 - b) *Part IV,*
 - i. *Laboratory Records*
 - ii. *Records Requests and Release of Laboratory Records and Information*
 - iii. *Expunction and Destruction of Laboratory Records and Information*
 - c) *Part V, Electronic Storage and Archival of Records*
2. Texas Department of Public Safety General Manual:
 - a) *Chapter 5, Sec. 05.20.00 – Documentation, Preservation and Disclosure of Evidence*
 - b) *Chapter 21 – Records and Information Policies*
 - c) *Chapter 26, Sec. 26.110.02 – Email Acceptable Use Policy*
3. Texas Code of Criminal Procedure, Title 1, Chapter 1, Art. 39.14 – Discovery
4. Texas Government Code, Title 4, Subtitle D, Chapter 441, Subchapter A
 - a) *Sec. 441.187 – Destruction of State Records*
 - b) *Sec. 441.191 – Alienation of State Records Prohibited*
 - c) *Sec. 441.192 – Right of Recovery*
5. Texas Penal Code, Title 8, Chapter 37, Sec. 37.10 – Tampering with Governmental Record.

10.3 Practice

A. Independent Exercises

Complete the DPS Records Management Training (online) within 60 days of hire.

10.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



PART II: FORENSIC LEGAL UNIT

11 Overview of Legal Processes and Testimony

Duration 2 to 4 days

Purpose To familiarize the trainee with basic legal terminology, the Federal and Texas court systems' structure and procedures, and the basics of courtroom testimony.

Prerequisite New Employee Orientation, Forensic Science, Evidence Handling

11.1 Objectives

A. Theoretical

The trainee will review the structure of Federal and Texas court systems, understand legal terminology, and review legal processes such as depositions, motions, discovery, jury trial, and courtroom testimony.

B. Practical

Following the completion of training the trainee will

1. Be familiar with the language of the judicial system
2. Be familiar with Texas criminal laws and to look up information about punishment and offenses
3. Be familiar with the various State and Federal courts through which a criminal case might progress, from origination to final appeal
4. Be familiar with the possibilities for the resolution of a criminal complaint
5. Be familiar with the flow of proceedings for a typical jury trial
6. Understand the basics of courtroom testimony

11.2 Training Outline

A. Lesson Plan

1. Legal definitions and terminology
2. Discipline-specific legal opinions
3. Court Systems
 - a) *Federal Court System*
 - i. *Federal Courts*
 - ii. *Rules of Practice*
 1. **Federal Rules of Criminal Procedure**
 2. **Federal Rules of Civil Procedure**
 - b) *Texas Court System*
 - i. *Texas Courts Structure*
 - ii. *Texas Justice System*
 - iii. *Texas Criminal Justice Process*
 - iv. *Rules of Practice*



4. Texas Code of Criminal Procedure
 - a) *Search Warrants - Chapter 18*
 - b) *Duties and Powers of the Grand Jury - Chapter 20*
 - c) *Subpoenas and Attachment - Chapter 24*
 - d) *The Trial before the Jury - Chapter 36*
 - i. *Invocation of Rule - Article 36.03*
 - ii. *Not to Hear Testimony - Article 36.05*
 - iii. *Instructed by the Court - Article 36.06*
 - e) *Evidence in Criminal Actions - Chapter 38*
 - i. *Texas Forensic Science Commission - Article 38.01*
 - ii. *Forensic Analysis of Evidence; Admissibility - Article 38.35*
 - iii. *Certificate of Analysis - Article 38.41*
 - iv. *Chain of Custody Affidavit - Article 38.42*
 - v. *Preservation of Evidence Containing Biological Material - Article 38.43*
 - f) *Depositions and Discovery - Chapter 39*
 - g) *Confidentiality of Identifying Information of Sex Offense Victims - Chapter 57*
5. DPS Policies concerning Testimony, Disclosure, and Release of Information
 - a) *DPS General Manual, as cited*
 - i. *Documentation, Preservation and Disclosure of Evidence – 05.20*
 - ii. *Testimony on Behalf of a Criminal Defendant – 05.25*
 - iii. *Court Appearances and Testimony - 05.54*
 - iv. *Confidential Information - 05.75*
 - v. *Public Speeches and Articles - 05.76*
 - vi. *Public Statements - 05.78*
 - vii. *Social Networking Policy - 05.79*
 - viii. *Determining Appropriate Level of Discipline – 07.43.07*
 - ix. *Release of Information in Criminal Investigations – 21.02*
 - x. *Public Information Requests - 21.03*
 - b) *Crime Laboratory Service Manual*
 - i. *Crime lab overview (Chapter 1)*
 - ii. *Management system (Ch 8)*
 - iii. *Court testimony monitoring (Ch 38)*
 - iv. *Release of records (Ch 56)*
 - v. *Forensic disclosure and compliance policy (Ch 34)*
6. Testimony Training
 - a) *Types of subpoenas*



- b) *Understanding roles and responsibilities*
 - i. *Witness*
 - 1. *Arrival at court*
 - 2. *Demeanor, body language, credibility, and professionalism*
 - 3. *Qualifying as an expert witness*
 - 4. *Presentation of scientific principles and results in an understandable manner*
 - ii. *Judge*
 - iii. *Prosecutor*
 - iv. *Defense*
- 7. *Courtroom Presentation*
 - a) *Pretrial preparation*
 - b) *Proper dress and appearance*
 - i. *Courtroom attire (CLS – Conditions of Employment, Attire and Appearance section)*
 - ii. *Employee appearance (General Manual 05.65)*
 - c) *Courtroom etiquette*
- 8. *Recognize and Anticipate Strategies*
 - a) *Defense trial strategies*
 - b) *Witness strategies*
 - c) *Types of questions*
 - d) *Impeachment*
 - e) *Closing*
 - f) *Outside defense strategies*

B. *Required Readings*

- 1. *Texas Department of Public Safety General Manual:*
 - a) *Chapter 5 Doctrines, Policies, and Operating Procedures*
 - i. *Sec. 05.20.00 Documentation, Preservation and Disclosure of Evidence*
 - ii. *Sec. 05.25.00 Testimony on Behalf of a Criminal Defendant*
 - iii. *Sec. 05.54.00 Court Appearances and Testimony*
 - iv. *Sec. 05.75.00 Confidential Information*
 - v. *Sec. 05.76.00 Public Speeches and Articles*
 - vi. *Sec. 05.78v Public Statements*
 - vii. *Sec. 05.79.00 Social Networking Policy.*
 - viii. *Sec. 05.108 DPS Honor Code*
 - b) *Chapter 6, Sec. 06.10.01 – DPS Ten General Orders*
 - c) *Chapter 6, Sec. 06.20.02 – Standards of Conduct*
 - d) *Chapter 7, Sec. 43.07.00 – Determining the Appropriate Level of Discipline*



- e) *Chapter 21 – Records and Information Policies*
 - i. *Sec. 21.02.00, Subsection 02.02 – Release of Information in Criminal Investigations*
 - ii. *Sec. 21.03.00 – Public Information Requests*
2. *Texas Department of Public Safety Crime Laboratory Service Manual (CLS):*
 - a) *Introduction, Scope chapter*
 - b) *Part I,*
 - i. *General Requirements*
 - ii. *Structural Requirements*
 - c) *Part III,*
 - i. *Conditions of Employment*
 - ii. *Forensic Disclosure and Compliance Policy*
 - iii. *Court Testimony and Monitoring*
 - d) *Part IV, Records Requests and Release of Laboratory Records and Information*
3. *Texas Code of Criminal Procedure, Title 1*
 - a) *Chapter 18 – Search Warrants*
 - b) *Chapter 20 – Duties and Powers of the Grand Jury*
 - c) *Chapter 24 – Subpeona and Attachment*
 - d) *Chapter 36 – The Trial Before the Jury*
 - i. *Art. 36.03 – Invocation of Rule*
 - ii. *Art. 36.05 – Not to Hear Testimony*
 - iii. *Art. 36.06 – Instructed by the Court*
 - e) *Chapter 38 – Evidence in Criminal Actions*
 - i. *Art. 38.01 – Texas Forensic Science Commission*
 - ii. *Art. 38.35 – Forensic Analysis of Evidence; Admissibility*
 - iii. *Art. 38.41 – Certificate of Analysis*
 - iv. *Art. 38.42 – Chain of Custody Affidavit*
 - v. *Art. 38.43 – Evidence Containing Biological Material*
 - f) *Chapter 39 – Depositions and Discovery*
 - g) *Chapter 57 – Confidentiality of Identifying Information of Victims of Sex Offense Victims*
4. *Salinas, O. C. Texas Department of Public Safety Crime Laboratory Service Courtroom Testimony [PowerPoint presentation].*
5. *Alpert, R. Expectations of Forensic Analysts in the Courtroom [PowerPoint presentation].*
6. *Bowers, C. M. Forensic Testimony: Science, Law and Expert Evidence. Elsevier: 2014. Chapter 3 - 9, pp 41-178.*



C. Suggested Readings/Presentations

1. Miller, T. H. Fundamentals of Expert Witness Direct Examination. Midwest Forensics Resource Center: Ames, IA, 2003. (DVD)

11.3 Practice

A. Supervised Performance

Observe courtroom testimony of experienced DPS analysts on cases involving the trainee's specific discipline, whenever possible. (Optional for CODIS)

1. Keep a record of witnesses and cases observed.
2. If possible, observe one trial from start to finish, including jury selection and closing arguments.

B. Independent Exercises

OPTIONAL: Complete the Legal Terms Exercise (LAB-GLT-08)

11.4 Assessment

- A. The trainee must complete all assignments. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



12 Rules of Evidence and General Legal Opinions

Duration 2 to 4 days

Purpose To provide a thorough grounding in the rules of evidence for expert witnesses and significant rulings which impact scientific testimony

Prerequisite New Employee Orientation, Forensic Science, Evidence Handling, Overview of Legal Processes and Testimony

12.1 Objectives

A. Theoretical

The trainee will review the Federal and Texas rules of evidence and important case rulings regarding evidence and witness admissibility.

B. Practical

Following the completion of training the trainee will

1. Be familiar with the significance of the State and Federal Rules of Evidence for evidence admissibility.
2. Be familiar with the terms Frye test, Daubert hearing, Kelly test, Brady material, Michael Morton Act, and the "Fruit of the Poisonous Tree" doctrine and understand why each is significant to the forensic scientist.

12.2 Training Outline

A. Lesson Plan

1. Federal Rules of Evidence

a) *Testimony by Experts - Rule 702*

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

b) *Bases of Opinion Testimony by Experts - Rule 703*

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert's opinion substantially outweighs their prejudicial effect.

c) *Disclosure of Facts or Data Underlying Expert Opinion - Rule 705*

The expert may testify in terms of opinion or inference and give reasons therefore without first testifying to the underlying facts or data, unless the court requires



otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.

2. Texas Rules of Evidence
 - a) *Relevancy and Its Limits - Article IV*
 - b) *Witnesses - Article VI*
 - c) *Opinions and Expert Testimony - Article VII*
 - d) *Hearsay - Article VIII*
 - e) *Contents of Writing, Recordings and Photographs - Article X*
3. Sequestration of Expert Witness
 - a) *Sequestration of witnesses serves two related policies:*
 - i. *To prevent witnesses from tailoring testimony in light of the testimony of other witnesses,*
 - ii. *To permit discovery of false testimony and other credibility problems.*
 - b) *In Texas, Civil Rule 267 and Evidence Rule 614 provides for sequestration of witnesses. "Although an expert witness may typically be found exempt under the essential presence exception, experts are not automatically exempt." Drilex Systems, Inc. v. Flores (Aug 1999). In Drilex, the party never established and the trial court never made a finding that the expert witness was in fact exempt under the rule. In Texas, if "the rule" is invoked, a witness who is not exempt from "the rule" is not free to discuss the case with another witness outside the courtroom or to be in the courtroom during testimony of others.*
4. Rulings significant to admissibility of evidence and of expert witness
 - a) *Federal Admissibility*
 - i. *Frye Standard (Frye v. United States (1923))*

Frye involved the admissibility of opinion evidence based upon the use of an early version of the polygraph. The D.C. Circuit Court held that scientific evidence was admissible if it was based on a scientific technique generally accepted as reliable in the scientific community. Thus, Expert Testimony was admitted based on the expert's credentials, experience, skill, and reputation. The theory was that deficiencies or flaws in the expert's conclusions would be exposed through cross-examination. This decision became known as the Frye test or the general-acceptance test. By the 1990s, the Frye test had become the majority view in federal and state courts for the admissibility of new or unusual scientific evidence, even in view of Federal Rule of Evidence 702, passed in 1975, which some courts believed to provide a more flexible test for admissibility of opinion testimony by expert witnesses.
 - ii. *Daubert v. Merrell Dow Pharmaceuticals*

In Daubert, 509 U.S. 579 (1993), the Court stated that evidence based on innovative or unusual scientific knowledge may be admitted only after it has been established that the evidence is reliable and scientifically valid. The Court also imposed a gatekeeping function on trial judges by charging them with preventing "junk science" from entering the courtroom as evidence. To that end, Daubert outlined four considerations: testing, peer review, error



rates, and acceptability in the relevant scientific community. These four tests for reliability are known as the Daubert factors or the Daubert test.

iii. *General Electric Co. v. Joiner*, 522 U.S. 136 (1997)

iv. *Kumho Tire Co. v. Carmichael* (1999)

b) **Texas Admissibility**

i. *Judicial Gate Keeping in Texas* [Allen, T. 1997].

ii. *Barry Dean Kelly v. Texas* (1992) [Texas variation on Frye, predating Daubert]

iii. *Texas variations on Daubert:*

1. ***Du Pont v. Robinson* (1995)**

Through *Robinson*, the Supreme Court of Texas essentially adopted Justice Blackmun's "general observations" in *Daubert*, ruling that Texas trial courts should consider these factors when evaluating expert scientific testimony. However, the *Robinson* court then added two other factors to the *Daubert* "general observations." These can be summarized as follows: (1) the extent to which the technique relies upon the subjective interpretation of the expert; and (2) the non-judicial uses which have been made of the theory or technique.

2. ***Broders v. Heise* (1996)**

3. ***United Blood Services v. Longoria* (1997)**

4. ***Merrell Dow Pharmaceuticals, Inc. v. Havner; Dow v. Havner* (1997)**

5. ***Maritime Overseas Corp v. Ellis* (1998)**

6. ***Gammill v. Chevrolet* (1998)**

7. ***Eric Charles Nenno v. Doug Dretke* (2006)**

8. ***Allan Spock Hartman v. Texas* (1999) (overruled by Bagheri)**

Held that Kelly test for determining admissibility of scientific evidence, requiring that scientific evidence be sufficiently reliable and relevant to help jury in reaching accurate results, is not limited to novel scientific evidence but, rather, applies to all scientific evidence. *Paredes v. Texas* (2015)

c) **Federal "Fruit of the Poisonous Tree" Doctrine**

i. *Silverthorne Lumber Co. v. United States* 251 U.S. 385 (1920) was a U.S. Supreme Court Case in which *Silverthorne* attempted to evade paying taxes. Federal Agents illegally seized tax books from *Silverthorne*, and created photocopies of the records. The issue in this case is whether or not derivatives of illegal evidence are permissible in court. The ruling was that to permit derivatives would encourage police to circumvent the 4th Amendment (unreasonable search and seizures), so the illegal photocopied evidence was held tainted and inadmissible. This precedent is known as *Fruit of the Poisonous Tree* and is an extension of the exclusionary rule, which prevents evidence obtained in violation of the 4th Amendment from being admitted in a criminal trial.

ii. *Mapp v. Ohio* (1961) was a landmark case in the area of U.S. criminal procedure, in which the United States Supreme Court decided that all evidence obtained by searches and seizures in violation of the Federal Constitution is inadmissible in a criminal trial in a state court.

d) **Federal Duty to Disclose**

i. The landmark decision of *Brady v. Maryland* (1963) places an affirmative constitutional duty on a prosecutor to disclose exculpatory evidence to a defendant. This duty has been extended to police agencies through case law,



requiring law enforcement agencies to notify the prosecutor of any potential exculpatory information.

Exculpatory evidence/Brady material: *Evidence in the government's possession that is favorable to the accused and that is material to either guilt or punishment, including evidence that may impact the credibility of a witness.*

- ii. *In 1972, the Giglio v. United States case expanded the Brady decision to require prosecutors to provide information to the defense counsel which could tend to impeach a witness.*
- iii. *The Jencks Act is a statute entitling a criminal defendant in a federal prosecution to discover any witness statement against him which is relevant to the witness's testimony and which is in the possession of the United States government. It was enacted after the U.S. Supreme Court held that defendants were entitled to such material. Since the Act restricts the defendant's access to such material until after the witness has testified in court against him, pretrial discovery of such material is not permitted. Testimony of a grand jury witness is specifically included in the definition of "statement" by virtue of a later-enacted amendment to the Act.*

e) *State Duty to Disclose*

The Michael Morton Act is a statute designed to ensure a more open discovery process and to reduce wrongful convictions. The U.S. Supreme Court's decision in Brady v. Maryland already requires prosecutors to hand over to defendants any evidence that is "material either to guilt or to punishment," but the Michael Morton Act requires disclosure of all police reports and witness statements, regardless of whether the evidence is material to guilt or punishment.

f) *Texas Duty to Preserve Evidence, Records*

- i. *Juan Manuel Fonseca v. Texas (2004) [spoliation]*
- ii. *Jose Pena v. Texas (2007)*

g) *Texas Admissibility of Testimony by Other than Examiner*

- i. *Timothy Brian Cole v. Texas (1992)*
- ii. *Fidel Y. Aguilar v. Texas (1994)*
- iii. *Maria Martinez v. Texas (2000)*
- iv. *Melendez-Diaz v. Massachusetts (2008)*
- v. *People v. Holmes (2012)*
- vi. *Bullcoming v. New Mexico (2011)*
- vii. *Paredes v. Texas (2015)*

B. *Required Readings/Presentations*

- 1. *All cited cases*
- 2. *Texas Code of Criminal Procedure, Title 1, Chapter 39 Depositions and Discovery.*
- 3. *Brady v Maryland. 373 US 83 (1963). Supreme Court of the United States. No. 490*
- 4. *Texas District and County Attorneys Association. Mandatory Brady Training [video]*
- 5. *Gutman, D. Buffey Rape Case Sets Precedent: Prosecutors Must Disclose Evidence. West Virginia Gazette Mail, Nov. 10, 2015.*



6. Hervey, M. Just Disclose It. *Texas District & County Attorneys Association*, 2016.
7. Laurin, J. The Massachusetts Lab Scandals: Confronting the New Normal of Mass Error in Criminal Justice. *In Justice Today*, Oct 10, 2017.
8. Mills, S. Controversial Ex-Forensic Lab Analyst Focus of Another Inmate's Appeal. *Chicago Tribune*, Jan 31, 2017.
9. Morin, G. Judge Reverses Murder Conviction Saying Crucial DNA Information Not Disclosed. *The San Diego Union-Tribune*, Oct 24, 2017.
10. National Commission on Forensic Science. Pretrial Discovery in Forensic Evidence Cases. National Institute of Standards and Technology (NIST) U.S. Department of Justice.
11. Discipline-Specific Legal Opinions ([Chapter 13](#))

12.3 Practice

None

12.4 Assessment

- A. Successful completion of this module is determined by the trainer.
- B. The trainer may opt for the trainee to complete a written exam.



13 Discipline-Specific Legal Opinions

13.1 Training Outline

A. Texas Penal Code

1. Punishments – Title 3, Chapter 12
2. Offenses (Title 5, Ch 19-22; Title 8, Ch 36-39; Title 10, Ch 46-49)
 - a) *Criminal Homicide - Chapter 19*
 - b) *Kidnapping and Unlawful Restraint - Chapter 20*
 - c) *Sexual Offenses - Chapter 21*
 - d) *Assaultive Offenses - Chapter 22*
 - e) *Bribery and Corrupt Influence - Chapter 36*
 - f) *Perjury and Other Falsification - Chapter 37*
 - g) *Intoxication and Alcoholic Beverage Offenses - Chapter 49*

B. Texas Health & Safety Code 481 Title 6, Subtitle C, Chapter 481 Texas Controlled Substances Act

1. Definitions - Sec. 481.002
2. Schedules - Sec. 481.032
3. Criminal Classification - Sec. 481.101
4. Simulated Controlled Substances - Chapter 482
5. Dangerous Drugs - Chapter 483
6. Volatile Chemicals - Chapter 484
7. Abusable Volatile Chemicals - Chapter 485

C. Texas Code of Criminal Procedure

1. General Duties of Officers - Chapter 2
2. Duties of District Attorneys - Art. 2.01
3. Duties of County Attorneys Art. 2.02
4. Who Are Peace Officers - Art. 2.12
5. Courts and Criminal Jurisdiction - Chapter 4
6. What Courts Have Criminal Jurisdiction - Art. 4.01
7. Limitation - Chapter 12
8. The Pleadings in Criminal Actions - Chapter 27
9. Motions, Pleadings and Exceptions - Chapter 28
10. Inquests Upon Dead Bodies - Chapter 49
11. Rights of Crime Victims - Chapter 56



D. How Are Criminal Cases Resolved? (Trial)

Steps in the Texas Criminal Judicial Process (taken from A Citizen's Guide, prepared by the State Bar of Texas Criminal Justice Section)

1. Texas Criminal Justice Process
2. Texas Rules of Appellate Procedure

13.2 Significant Discipline Court Opinions

A. Seized Drugs

1. Usable quantity
 - a) *Raleigh Lejeune v. Texas (1976)*
 - b) *Charles William Johnson v. Texas (1983)*
 - c) *Rafael Alvarado v. Texas (1995)*
2. Codeine penalty group designation
 - a) *Brandon Linn Dudley v. Texas (2001)*
 - b) *Steven Sanchez v. Texas (2007)*
3. Adulterants and Diluents
 - a) *Craig William Reeves v. Texas (1990) [superseded by several]*
 - b) *Texas v. Donald Wayne Engelking (1991)*
 - c) *Deborah Kay Cawthon v. Texas (1992)*
 - d) *James Larry McGlothlin v. Texas (1995) [Superseded by Seals]*
 - e) *Douglas Willfred Marchand v. Texas (2003)*
 - f) *Robert Tyrone Lilly v. Texas (2003)*
 - g) *Ron Clyde Seals v. Texas (2005)*
4. Random sampling
 - a) *Juan Jesus Gabriel v. Texas (1995)*
 - b) *Harlan Gene Melton v. Texas (2003)*
5. Species of marihuana
 - a) *David Glenn Williams v. Texas (1975)*
 - b) *Robert Booker Carmouche v. Texas (1976)*

B. DNA

1. *Pennsylvania v. Pestinikas (1986)*

First use of PCR-based forensic DNA analysis (HLA DQa) in the United States. Used to confirm that two autopsy samples came from the same person. This is also the first use of any kind of DNA testing in the United States.
2. *Tommie Lee Andrews v. Florida (1988)*

DNA profiling is introduced for the first time in a U.S. criminal court. Based on RFLP analysis performed by Lifecodes, Tommy Lee ANDREWS is convicted of a series of sexual assaults in Orlando.



3. New York v. Joseph Castro (1989)
First case in which the admissibility of DNA is seriously challenged. It sets in motion a string of events that culminate in a call for certification, accreditation, standardization, and quality control guidelines for both DNA laboratories and the general forensic community.
 4. Barry Dean Kelly v. Texas (1992) [*landmark Texas DNA admissibility case*]
 5. Curtis Wayne Pope v. Texas (2006) [*defense expert witness*]
 6. Williams v. Illinois (2012) [*Cellmark result admitted without Cellmark report*]
- C. Trace Evidence
1. David Leonard Wood v. TDCJ (Summarizes Wood v. TX 1995) [*fiber case*]
 2. Warren Keith Rodgers v. Texas (2006) [*admissibility of tire track testimony*]
 3. Michael Blair v. Texas (2008)
The trial court concluded “The post-conviction DNA results and the evidence discovered in the State’s new investigation have substantially eroded the State’s trial case against [applicant]....”
- D. Friction Ridge
1. Illinois v. Thomas Jennings 252 Ill. 534, 96 N.E. 1077 (1911) [*Acceptance of legally identifying individuals*]
 2. New Jersey v. Charles Connors S7 N.J. Law 419, 94 Atl. 812 (1915) [*Admittance of photographs of latents*]
 3. B.J. McGarry v. Texas 82 Tex 597 (Texas) (1918) [*1st case in Texas admitting fingerprint testimony*]
 4. Nevada v. B.E. Kuhl 3 ALR 1694 (Nevada) (1918) [*Admissibility of palm print friction ridge skin to make identifications. Allows comparison of palms/photographs of palms*]
 5. State (Oregon) v. Smith 128 Or. 515, 273 P. 323 (1929)
 6. Stacy v. State (Oklahoma) 49 Okl. Crim. 154, 292 P. 885 (1930)
 7. People v. Les 267 Mich. 648 255 NW 407 (1934) [*Admissibility of footprint friction ridge skin to make identifications*]
 8. Commonwealth (Massachusetts) v. Bartolini 299 Mass. 503, 510, 13 N.E.2d 382, 387, cert. denied (1938)
 9. Newton Grice v. Texas 142 Tex. Crim. 4 151 SW 2nd 211 (1941)
Judicial Notice – that fingerprints are not duplicated (burden of proof moved from the prosecution to the defense to prove otherwise)
 10. Schmerber v. California 384 U.S. 757, 763-764 (1966)
The court held that the introduction into evidence of fingerprint impressions taken without the consent of the defendant was not an infringement of the constitutional privilege against self-incrimination
 11. United States v. Byron Mitchell Pennsylvania-U.S. District (2002) [*1st Fed. Daubert challenge to fingerprints*]



12. United States v. Mitchell Government Conclusions CN 96-00407 [*Judicial Notice – Human Friction Ridges Unique & Permanent*]
 13. United States v. Llera-Plaza
- E. Toxicology (Alcohol/Volatiles) and Breath Alcohol Analysis
1. Videotape of traffic stop
 2. William Thomas Wagner v. Texas (1986)
 3. Bonnie Alice Owen v. Texas (1995)
 4. DPS v. Carol Ann Cortinas (1998) [*affidavit of breath test results admissible at ALR hearing*]
 5. Retrograde extrapolation
 - a) *Teresa Martin v. DPS (1998)*
 - b) *Albert Mireles v. DPS (1998)*
 - c) *Allan Spock Hartman v. Texas (1999) [overruled by Bagheri]*
 - d) *Hossein Bagheri v. Texas (2003)*
 - e) *Raul Mata v. Texas (2004)*
 - f) *Dawn Kuretsch Stewart v. Texas (2005)*
 - g) *Edwin Glen Bigon v. Texas (2008)*
 6. Prior DUI conviction admitted Kenneth Lawrence v. Texas (2000)
 7. Bullcoming v. New Mexico [*lab report is testimonial but does not violate confrontation clause when results testified to by another qualified analyst*]
 8. Selection of DWI Court Decisions - Ansolabehere, J (2011)
- F. Firearms & Toolmarks
1. United States v. Marius St. Gerard (2010)
 2. Texas v. Thai-An Huu Nguyen (2011)
 3. United States v. John Charles McCluskey (2013)
 4. California v. Earl Eugene Rose (2009)
 5. Florida v. Shawn Emmanuel Richardson (2013)
 6. Other resources are available under the AFTE Admissibility Resource Kit (ARK) at www.afte.org
- G. Digital/Multimedia – Computer Forensics/Mobile Forensics Examiners:
1. Court Opinions on Child Pornography:
 - a) *United States v. Husmann, 765 F.3d 169 (3rd Cir. 2014)*
 - b) *United States v. Emly, 747 F.3d 974 (8th Cir. 2014)*
 - c) *United States v. Dorst, 636 F.Supp. 828 (S.D.Cal. 1986)*



2. Court Opinions on Search Incident to Arrest:
 - a) *Riley v. California*
 - b) *United States v. Wurie*
- H. Court Opinions on Authentication of Digital Evidence:
 - a) *United States v. Scholle, 553 F.2d 1109 (8th Cir. 1976)*
 - b) *United States v. Vela, 673 F.2d 86, 90 (5th Cir. 1982)*
2. Court Opinions on Plain View Searches:
 - a) *United States v. Comprehensive Drug Testing, Inc., 513 F.3d 1085, 1116 (9th Cir. 2008), rev'd en banc, 579 F.3d 989 (9th Cir. 2009)*
 - b) *United States v. Mann*
 - c) *United States v. Williams (2010 United States Court of Appeals, Fourth Circuit)*
- I. Digital/Multimedia– Audio/Video/Image Enhancement Examiners:
 1. *United States v. Mosley (1994; United States Court of Appeals for the Ninth Circuit) [enhanced images can be admitted in court]*
 2. *Dolan v. State of Florida [video evidence is properly admitted if authentication and integrity are established]*
 3. *Washington v. State of Maryland (2006; decided 2008) [Authentication of video evidence]*
 4. *Fontaine v. People of the Virgin Islands [video evidence should not be interpreted by an individual who is not an expert in the field or a witness to the events]*
- J. Forensic Document Examination
 1. *Gilbert v. California 388 U.S. 263 (1967)*

The court held that it is not a violation of the defendant's Fifth Amendment right against self incrimination to require that he give a handwriting exemplar. The court reasoned: The privilege reaches only the compulsion of an accused's communications, whatever form they might take, and the compulsion of responses which are also communications, for example compliance with a subpoena to produce one's papers, "and not" compulsion which makes a suspect or accused the source of "real or physical evidence."
 2. *Schmerber v. California 384 U.S. 757, 763-764 (1966)*

One's voice and handwriting are, of course means of communication. It by no means follows, however, that every compulsion of an accused to use his voice or write compels a communication within the cover of the privilege. A mere handwriting exemplar, in contrast to the content of what is written, like the voice or body itself, is an identifying physical characteristic outside its protection.
 3. *United States v. Mara 410 U.S. 19 (1973)*

The court held that a grand jury subpoena for a handwriting specimen was not a "seizure" under the Fourth Amendment. "Handwriting like speech," is repeatedly shown to the public, and there is no expectation of privacy in the physical characteristics of a person's script than there is in the tone of his voice.



PART III: ADVANCED TOPICS UNIT

14 Measurement Uncertainty

Duration 1 to 3 days

Purpose To inform examiners of the steps taken to determine reported measurement uncertainties and to prepare them for presentation of the concept in court

Prerequisite New Employee Orientation, Forensic Science

14.1 Objectives

A. Theoretical

Every measurement is subject to uncertainty. According to ISO standards, every significant measurement must have a measurement uncertainty associated with it. Measurement uncertainties can come from the measuring equipment, from the item being measured, from the environment, from the operator, and from other sources. Such measurement uncertainties can be estimated using statistical analysis of a set of measurements, and identifying and including other kinds of information about the measurement process. There are established rules for how to calculate an overall estimate of measurement uncertainty from these individual pieces of information.

Uncertainty of measurement does not imply doubt about the validity or accuracy of the measurement; on the contrary, knowledge of the uncertainty implies increased confidence in the validity of a measurement result.

B. Practical

Following the completion of this module, the trainee will:

1. Understand the concepts usually encountered when discussing measurement uncertainty and the reporting of it.
2. Understand the established rules for calculating a measurement uncertainty value.

14.2 Training Outline

A. Lesson Plan

1. Commonly used definitions in measurement uncertainty
 - a) **Accuracy** – Closeness of the agreement between measurement results and the accepted reference value. High accuracy is the same as low error. (Accuracy is a qualitative term only)
 - b) **Bias** (of measuring instrument) – Systematic error of the indication of a measuring instrument.
 - c) **Calibration** – Operation that establishes a relationship between the value/response of a measuring instrument and the accepted values of the standards.
 - d) **Combined Standard Uncertainty** – The result of the combination of standard uncertainty components.
 - e) **Confidence level** – Number (e.g., 95%) expressing the degree of confidence in a result.
 - f) **Correlation** – Independence or relationship between data or measured quantities.



- g) **Coverage factor** – A number that when multiplied by the combined standard uncertainty, produces an interval (the expanded uncertainty) about the measurement result that may be expected to encompass a large, specified fraction (e.g. 95%) of the distribution of values that could be reasonably attributed to the measurand.
- h) **Error** – Offset or deviation between the result of a single measurement and the correct value; does not mean that a mistake was made.
- i) **Expanded uncertainty** – Standard uncertainty (or combined standard uncertainty) multiplied by a coverage factor k to give a particular level of confidence.
- j) **Expression of uncertainty** – Measurand \pm uncertainty (e.g.-a confidence level 95% with a coverage factor, $k = 2$).
- k) **GUM** – Guide to the Expression of Uncertainty in Measurement, published by ISO to encourage uniformity in the way uncertainty in measurement is determined and expressed.
- l) **Mean** – Average of a set of measurements.
- m) **Measurand** – Particular quantity subject to measurement.
- n) **Normal distribution** – Distribution of values in a characteristic pattern of spread (Gaussian curve) with values more likely to fall near the mean than away from it.
- o) **Precision** – Closeness of agreement between test results under stipulated conditions
- p) **Range** – Difference between the highest and lowest of a set of values.
- q) **Rectangular distribution** – Distribution of values have equal likelihood of falling anywhere within a range.
- r) **Repeatability** – Closeness of agreement between repeated measurements using the same method/equipment by the same person on the same test item over a short time interval.
- s) **Reproducibility** – Closeness of agreement between measurements using the same method to measure the same or identical test item by different people with different equipment at different locations, and potentially at different times.
- t) **Resolution** – The smallest increment of change in the measured parameter which can be measured with the instrument.
- u) **Standard deviation** – A measure of the spread of a set of results, describing how values typically differ from the average of the set.
- v) **Standard uncertainty** – Uncertainty of a measurement expressed as a margin equivalent to plus and minus (\pm) one standard deviation.
- w) **Systematic error** – An error which is inherent in a measuring system. It biases a measurement result in a particular direction. It can be reduced by optimizing the system design. It can in principle be estimated and a correction can be applied.
- x) **Traceability** – The ability to relate the accuracy of measurement back to the appropriate standard through an unbroken chain of comparisons all having stated uncertainties.
- y) **Triangular distribution** – Distribution of values near the nominal value are more likely than those near the extremes



- z) **True value** – The value that would be obtained by a theoretical perfect measurement.
 - aa) **Type A evaluation of uncertainty** – An uncertainty which is determined by repeating a measurement a number of times and performing a statistical analysis on the results.
 - bb) **Type B evaluation of uncertainty** – Evaluation of uncertainty by non-statistical methods; by any means other than for Type A.
 - cc) **Uncertainty budget** – Summary of the combined uncertainty calculations including a listing of all factors that contribute to the overall uncertainty measurement for a process.
 - dd) **Uncertainty of measurement** – An estimate of the range of values within which the true value is likely to be found.
2. Other measurement uncertainty concepts
- a) A measurement:
 - i. Tells us about a property of something
 - ii. Gives a number to that property
 - iii. Always made using equipment of some type
 - iv. Expressed in two parts: a number and a unit (e.g. 0.2 mg)
 - b) Uncertainty of measurement:
 - i. A range of values within which any other measured value of the same item would be expected to be found
 - ii. Usually expressed in terms of a 95% confidence limit, but may be 99.7%
 - iii. Define and classify components of measurement uncertainty
 1. **Type A Uncertainty** – statistical (usually from repeated measurements)
 2. **Type B Uncertainty** – estimates from any other source (e.g.-past experience, calibration certificates, manufacturer's specifications, calculations, published information)
 3. Typically both types are necessary when determining combined measurement uncertainty.
 - c) Error vs. Uncertainty
 - i. Uncertainty is not error
 - ii. Error is the difference between the measured value and the true value
 - iii. Uncertainty is the calculated range of values where the true value exists. It allows the analyst to say with a given confidence level that if the experiment was repeated, the true value has a high probability of being somewhere in this range.
 - d) Basic statistical calculations (of a set of measurements)
 - i. Mean or average (\bar{X}) - sum of all measurement values divided by the number of measurements.
 - ii. How many measurements should be taken to determine an average?
 1. **The more results you use, the closer you get to the ideal estimate of the mean**
 2. **Performing more measurements takes extra effort, and at some point will yield diminishing returns with respect to changing the average**



3. A general rule of thumb is 4-10 measurements is sufficient

- iii. Standard deviation – Spread of the measurements (σ) in a normal distribution [expresses how different the individual measurements typically are from the average], where

x = the value; X = the average; n = the number of measurements made

$$\sigma = \sqrt{\frac{\sum (x - X)^2}{(n - 1)}}$$

- iv. Standard deviation for a rectangular distribution can be derived by the equation, where a = the range of the measurements collected or expected; acceptance range:

$$\sigma = \frac{a}{\sqrt{3}}$$

- v. Standard deviation for a triangular distribution can be derived by the equation, where a = the range of the measurements collected or expected and σ is the square root of the variance; acceptance range:

$$\sigma = \frac{a}{\sqrt{6}}$$

1. ***With triangular distributions, the denominator value is determined based on the assumed shape of the triangle.**
2. ***6 is used when the triangle shape is isosceles (symmetric triangular distribution).**
3. ***18 is used when the triangle shape is a right triangle with the right angle above the highest point.**

- vi. One standard deviation = 68% of all measurements will fall between plus and minus (+/-) one standard deviation of the mean (assuming an equal distribution, approximately 34% of the values will be less than the mean value and 34% of the values will be greater than the mean value)
- vii. Two standard deviations = 95% of all measurements will fall between plus and minus (+/-) two standard deviations of the mean (assuming an equal distribution, approximately 47.5% of the values will be less than the mean value and 47.5% of the values will be greater than the mean value)
- viii. Three standard deviations = 99.7% of all measurements will fall between plus and minus (+/-) three standard deviations of the mean (assuming an equal distribution, approximately 49.85% of the values will be less than the mean value and 49.85% of the values will be greater than the mean value)

- e) Where do measurement uncertainties come from? (a sub-set of potential factors)
- i. In general, each of these would be considered an individual factor which would make a contribution to the overall uncertainty in the reported measurement.
 1. **Measuring equipment**
 2. **Item being measured**
 3. **Measurement process**
 4. **Calibration of instruments**
 5. **Operator skills (e.g. parallax errors)**
 6. **Sampling issues**
 7. **Environmental conditions**



- ii. *Repeatability*
 - 1. **Estimation of best capability**
 - 2. **Control all variables; eliminate as many as possible**
 - 3. **Short term**
 - iii. *Reproducibility*
 - 1. **Estimation of day-to-day capability**
 - 2. **Include all variables, but stay within specified limits**
 - 3. **Long term**
 - iv. *Divisors for converting expanded standard deviations into standard deviation:*
 - v. *If the distribution is normal and the standard deviation is already expressed as 1σ*
 - vi. *If the distribution is normal and the standard deviation is expressed as 2σ (a 95% confidence limit)*
 - vii. *If the distribution is normal and the standard deviation is expressed as 3σ (a 99.7% confidence limit)*
 - viii. $\sqrt{3}$ - *If the distribution is rectangular*
 - ix. * - *If the distribution is triangular, the divisor varies based on the shape of the distribution*
- f) *What is not a measurement uncertainty*
- i. *Mistakes made by examiners are not measurement uncertainties and should not be counted as making a contribution to the combined uncertainty.*
 - ii. *Tolerances are not measurement uncertainties. They are acceptance limits chosen for a process or a product.*
 - iii. *Accuracy (or to put it another way, inaccuracy) is not the same as measurement uncertainty. Many times the two words are used synonymously but they in fact, have separate meanings. Accuracy has a qualitative value associated with it. Uncertainty has a quantitative value associated with it.*
 - iv. *Error is not uncertainty. (See previous descriptions of these two terms and the differentiation)*

3. GUM (Guide to the Expression of Uncertainty Measurement) approach

The determination of the uncertainty of measurements reported by the Texas DPS Crime Laboratory Service followed an eight-step GUM approach.

- a) **Step 1: Define what is being measured**

The accrediting body requires that the measurement uncertainty be evaluated, or estimated when applicable, for all reported quantitative results.
- b) **Step 2: Identify the sources of uncertainty**
 - i. *Prepare a list of any and all components of the defined process which might be sources of uncertainty. Some of these would be things like:*
 - 1. **Sampling – Is the sample homogeneous? What sampling plan will be used? Are there any environmental effects on the sampling?**
 - 2. **Use of a Certified Reference Material (CRM) or other control – The certificate that accompanies these should bear the uncertainty of the material as determined by the manufacturer. Is there a potential matrix effect issue?**
 - 3. **Calibration curves – Taking into account uncertainty of reference materials (derived from certificates), matrix effects, and instrument precision**



4. **Sample preparation** – Will the sample be homogenized? Is there any drying or milling that must occur? Is there an extraction that must occur or conversely, must the material being tested be removed from solution? Does the sample need concentration or dilution? Will any derivatization be involved?
 5. **Analysis** – Systematic and/or random errors that are inherent in the process, subjective evaluations by examiner, what environmental effects, matrix effect issues, reagent purity, instrument parameters and settings, precision between runs
 6. **Data processing** – Taking an average of the results, rounding and truncating. Are statistics involved? The accuracy and precision of the calculator or spreadsheet used for any calculations could affect uncertainty. Methods used for rounding or truncating numbers could also affect uncertainty
- ii. From a practical standpoint, potential sources of uncertainty could be (from the realm of drug quantitation):
1. **Flask calibration**
 2. **Ambient room temperature**
 3. **Repeatability of making measurements in a Class A flask (or other class A volumetric glassware)**
 4. **Calibration and linearity of the balance used (from certificate)**
 5. **Repeatability of check weighings**
 6. **Purity of the calibrator (from certificate)**
 7. **Homogeneity of the sample tested**
- c) **Step 3: Reconcile uncertainty sources**
- Review the list of potential uncertainty contributors to determine if a particular source is adequately accounted for by data available; is there sufficient reproducibility data and/or data generated as a result of QC. It can be assumed that if an effect varies over the range of data point collected, then the uncertainty associated with that effect is adequately accounted for in the standard deviation determined from those data points. It is important that in this reconciliation process, the components are truly represented by the available data.
- d) **Step 4: Quantify uncertainty sources**
- It needs to be determined to what degree of significance each uncertainty component will make a contribution to the combined uncertainty. For the purposes of categorizing the uncertainty in a budget, they should be rated as either a type A uncertainty component or type B uncertainty component.
- i. **Type A components** are those that are determined by repeating a measurement a number of times and performing a statistical analysis on the results (repeatability data). Some sources of this type of data are QC data, validation studies, and proficiency test results. A “normal” or Gaussian-shaped distribution should occur if a sufficient number of measurements have been made. As part of the statistical analysis, calculate the mean and standard deviation of the collected results. As the number of data points increases, the sample mean becomes an adequate estimator of the population mean. And as a consequence the sample standard deviation becomes an adequate estimator of the population standard deviation.
 - ii. **Type B components** are those that are not measured by the laboratory. This type is contributed through calibration certificates of laboratory standards, instruments and equipment, manufacturer’s specification for analytical glassware, and reference data from handbooks.



e) **Step 5: Convert to standard uncertainties**

In the realm of uncertainty, standard deviation is also known as the estimated standard uncertainty. Be sure to convert uncertainties from all considered sources to the same units.

f) **Step 6: Combine uncertainties**

i. *Not all of the listed sources of uncertainty will have a significant contribution to the method's overall uncertainty; usually only a few do. It is typical practice that components with standard uncertainty values less than 1/3 of the largest standard uncertainty can be ignored in the final calculation. But it must be documented in some fashion that they were initially considered. Then determine if any of the remaining are correlated; usually they are not.*

ii. *If the uncertainties were to be correlated, the combination of their respective uncertainties can be represented by the equation:*

$$U_{\text{corr}} = (U_1 \pm U_2 \pm U_3 \pm U_4 \dots)$$

iii. *Uncorrelated uncertainties combine randomly and are combined using Root Sum Squares (RSS) which is represented by the equation:*

$$U_{\text{uncorr}} = \sqrt{(U_{\text{corr}}^2 + U_1^2 + U_2^2 + U_3^2 + U_4^2 \dots)}$$

iv. *The result of the above equation is also known as the combined standard uncertainty.*

g) **Step 7: Express as expanded uncertainty**

i. *In order to expand the combined standard uncertainty a coverage factor (k) is applied to the determined value. A coverage factor is a number that, when multiplied by the combined standard uncertainty, produces an interval around the measurement result that is expected to include a large specified percentage of possible other measurements made of item being tested.*

ii. *Another way to think of it is as a "normal" distribution; the value being reported is the mean and the uncertainty is the standard deviation(s) about that mean. At k=2, there is a 95% confidence level (or 95% of the time) that any other measurement taken of the item tested would fall into this range (± 2 standard deviations). At k=3, there is a 99.7% confidence level (or 99.7% of the time) that any other measurement taken of the item tested would fall into this range (± 3 standard deviations).*

h) **Step 8: Report results with uncertainty**

i. *The following general rule guidelines have been followed in the determination of uncertainty values to be reported in reports generated by the Texas DPS Crime Laboratory Service; where uncertainty is required because of the measurement made: it should be recognized that all uncertainties are only estimates, the uncertainty will be reported to the level of precision that the item tested is measured, includes the units of measurement, and the confidence limit or coverage.*

ii. *For example: a blood alcohol result: 0.081 mg/100 mL \pm 0.002 mg/100mL (99.7% confidence)*

B. Required Readings

1. United Kingdom Accreditation Service (UKAS). *The Expression of Uncertainty and Confidence in Measurement*. M3003. UKAS: Edition 3, 2012.



2. Bell, S. *A Beginner's Guide to Uncertainty of Measurement*. Measurement Good Practice Guide No. 11 (Issue 2). National Physical Laboratory (NPL): UK, 1999.
3. Goldsmith, M. *A Beginner's Guide to Measurement*. Good Practice Guide No. 118. National Physics Laboratory (NPL): UK, 2010.
4. Validation documents for the related discipline which are used to establish the expanded measurement uncertainty.
5. ANAB GD 2700, Guidance on Reporting Uncertainty of Measurement for Calibration Laboratories (**Breath Alcohol only**)

C. Suggested Readings/Courses

1. Joint Committee for Guides in Metrology (JCGM). *Uncertainty of Measurement – Part 3: Guide to the Expression of Uncertainty in Measurement (GUM:1995)*. ISO/IEC Guide 98-3:2008; ISO: Geneva, 2008.
2. LeBeau, M. *Introduction to Uncertainty in Forensic Chemistry and Toxicology*, course presented by RTI International, February 9, 2009. [RTI Forensic Science Education]
3. National Institute of Standards and Technology (NIST). *Standard Operating Procedure for the Assignment of Uncertainty*. SOP No. 29. NIST: 2003.
4. SWGDRUG. *Measurement Uncertainty for Weight Determinations in Seized Drugs Analysis*. Supplemental Document SD-3 for Part IV C – Quality Assurance/Uncertainty. SWGDRUG: 2011. (**Seized Drugs only**)
5. SWGDRUG. *Measurement Uncertainty for Purity Determinations in Seized Drugs Analysis*. Supplemental Document SD-4 for Part IV C – Quality Assurance/Uncertainty. SWGDRUG: 2013. (**Seized Drugs only**)
6. Indiana University Robert F. Borckenstein Course on Alcohol and Highway Safety: Testing, Research and Litigation. (**Breath/Blood Alcohol**)

14.3 Practice

A. Independent Exercises

1. The trainee will complete the Measurement Uncertainty Review Exercise (LAB-GLT-09), consisting of terms and concepts. Trainers are encouraged to add additional exercise questions, and should discuss the topics further as needed to ensure trainee understanding.
2. The trainer and/or discipline may elect to require RTI or other courses in uncertainty.

14.4 Assessment

- A. The trainee will explain, in layman terms, measurement uncertainty for his/her discipline. This assessment may be oral or written.
- B. Successful completion of the Measurement Uncertainty Unit is mandatory for testifying laboratory personnel in the following disciplines: Toxicology (Alcohol/Volatiles and/or Drugs), Breath Alcohol Testing, Seized Drugs, and Firearms & Toolmarks.



15 Advanced Quality Assurance

Duration 1 to 2 weeks

Purpose To familiarize the trainee with advanced topics in quality assurance

Prerequisite Introduction to Quality Assurance

15.1 Objectives

A. Theoretical

Formal methods of quality assurance help to ensure compliance with accreditation standards. The development, coordination and maintenance of reliable, uniform and scientifically sound laboratory procedures are dependent upon a solid quality assurance program. Quality management is comprised of key participants in the success of the quality assurance program. Their responsibilities, which are covered in this training module, ensure that the requirements of the quality system are implemented and maintained in order to achieve compliance with accreditation standards and maintain accreditation.

B. Practical

Following the completion of training the trainee will:

1. Understand document control and management processes.
2. Define and discuss policy deviation and write an effective deviation request.
3. Understand requirements for purchasing services and supplies.
4. Define and discuss nonconforming work, root cause analysis, and corrective action. Perform a thorough root cause analysis and construct an effective quality action plan for an incident.
5. Articulate the process steps and the documentation for a trainee to become an examiner.
6. Be familiar with the roles and responsibilities of advisory board members and Program Coordinators.
7. Be familiar with the relevant accreditation and quality assurance standards.
8. Understand the audit process and the roles and responsibilities of auditors.
9. Understand the process for validations and performance verifications.

15.2 Training Outline

A. Lesson Plan

Implementation of Concepts in the Laboratory

1. Document Control and Document Management (CLS – *Document Management and Deviation*)
 - a) *Policies and procedures*
 - b) *Guidelines for Writing Procedures and Training Manuals (CLS chapter)*
 - c) *Authorization of external documents*
 - d) *Control of instrument controlling software (ISO 6.4.13a)*



- e) *Control of other laboratory software such as LIMS, workbooks, macros (if they impact results)*
 - f) *Use of forms or electronic equivalents: Document Authorization (LAB-503), Document Awareness Form (LAB-504), External Document List (SharePoint), Laboratory Software List (SharePoint), Validation Form (LAB-408a), and Performance Verification Form (LAB-408b)*
2. Deviation Requests
- a) *Declaration of a planned policy deviation from documented procedures (CLS – Document Management and Deviation)*
 - b) *Use of Deviation Request (LAB-505) and Deviation Request Supplement (LAB-506) forms*
3. Validations and Performance Verifications (CLS chapter)
- a) *Validations and Performance Verifications (CLS; ISO 7.2.1.1)*
 - b) *Instruments and Equipment (CLS; ISO 6.4.5)*
 - c) *Use of Validation and Performance Verification forms (LAB-408a/LAB-408b)*
4. Customer Surveys (CLS – Customer Feedback – Surveys and Complaints)
- a) *Suggestions and/or Complaints*
 - b) *Use of form Customer Survey (LAB-501 or electronic equivalent)*
 - c) *Use of form Complaint Record (LAB-502 or electronic equivalent)*
5. Preventive Actions (CLS chapter)
- a) *Use of form Preventive Action Report (LAB-509) or electronic workflow*
6. Non-conforming work [CLS – Quality Incident (QI) and Quality Action Plan Process (QAP)]
- a) *Use of form Quality Incident Report (LAB-510) or electronic workflow*
7. Root Cause Analysis (CLS – Quality Incident (QI) and Quality Action Plan Process (QAP), Cause Analysis section; ISO 7.10)
- a) *Process-related, not personnel-related*
 - b) *Quality Incident/Quality Action Plan workflow*
 - c) *Use of form Action Plan/Supplement (LAB-512), Action Item Summary (LAB-513), and Action Monitoring Report (LAB-514)*
8. Records Management
- a) *Laboratory Records (CLS chapter)*
 - b) *Review of Laboratory Records (CLS chapter)*
 - c) *Archived/electronic records (CLS – Electronic Storage and Archival of Records)*
9. Training and Competency
- a) *Training certification of competency and approval for work*
 - i. *Employee Training Program (CLS chapter)*
 - ii. *Work Authorization (CLS chapter)*



- b) *Employee Career and Leadership Development (CLS chapter)*
 - c) *Continuing Education*
 - d) *Use of forms*
 - i. *Certificate of Completion (LAB-308)*
 - ii. *Work Authorization (LAB-309)*
 - iii. *Training Evaluation Form (LAB-304)*
10. *Examiner Assessment Testing (CLS – Monitoring the Validity of Results)*
- a) *Use of Examiner Assessment Report Form (LAB-312)*
 - b) *Examiner Assessment Reports and Log*
11. *Testimony Monitoring*
- a) *Testimony Monitoring (CLS – Court Testimony and Monitoring; ISO 7.7.1)*
 - b) *Use of Testimony Technical Review Form (LAB-313) and Testimony Survey Form (LAB-314)*
12. *Control of Purchased Products and Reagents*
- a) *Approved suppliers list (CLS – Externally Provided Products and Services)*
 - b) *Use of Supplier Approval Form (LAB-409)*
13. *Laboratory Audits (CLS – Audits)*
- a) *Laboratory Management System Surveys (CLS chapter)*
 - b) *Evidence storage location inventory (CLS – Evidence and Database Sample Integrity)*
 - c) *Safety Inspection (Safety Manual chapter)*
 - d) *Internal Audit (CLS – Audits)*
 - e) *Use of forms*
 - i. *Annual Laboratory Management System Survey (LAB-520)*
 - ii. *Quarterly Laboratory Management System Survey (LAB-521)*
 - iii. *Evidence and Database Sample Inspection Form (LAB-402)*
 - iv. *Laboratory Safety Checklist (LAB-SAF-01)*
 - v. *Internal Audit Direct Process Observation Form (LAB-516)*
 - vi. *Internal Audit Auditor Notes (LAB-517)*
 - vii. *Internal Audit On-Site Summation Form (LAB-518)*
14. *Advanced roles in the Management System (CLS – Laboratory System Roles and Responsibilities)*
- a) *Advisory Boards and Laboratory Committees (CLS chapter)*
 - b) *Auditors*
 - i. *Forensic ISO/IEC 17025 Assessor Training*
 - ii. *Quality Assurance Standards (QAS) Auditor Training*
 - iii. *Internal Audit Auditor Training*



5. Texas Code of Criminal Procedure
 - a) *Chapter 38*
 - i. *Article 38.01 – Texas Forensic Science Commission*
 - ii. *Article 38.35 – Forensic Analysis of Evidence; Admissibility*
 - iii. *Article 38.44 – Admissibility of Electronically Preserved Document*
 - b) *Chapter 39 - Depositions & Discovery*
 6. Koehler, D. J. *Root Cause Analysis* [PowerPoint presentation]. Texas Forensic Science Commission.
 7. National Commission on Forensic Science. *Root Cause Analysis (RCA) in Forensic Science*. National Institute of Standards and Technology (NIST), US. Department of Justice.
 8. Government Code, Title 5, Subtitle A, Chapter 552 – Public Information.
 9. DPS Records Retention Policy/Schedule
- C. Suggested Readings
1. The FBI Quality Assurance Standards Audit for Forensic DNA Testing Laboratories. Federal Bureau of Investigation.
 2. The FBI Quality Assurance Standards Audit for Forensic DNA Databasing Laboratories. Federal Bureau of Investigation.
 3. Garfield, F. M.; Klesta, E.; Hirsch, J. *Quality Assurance Principles for Analytical Laboratories*, 3rd Edition. AOAC Intl: Rockville, 2000.

15.3 Practice

A. Supervised Performance

1. Complete a document authorization form and document(s) for authorization
2. Prepare a modification of the external documents list for authorization
3. Complete a deviation request, including the form and supporting documentation
4. Prepare a validation/verification form for authorization
5. Initiate the quality incident process for a nonconforming event
6. Evaluate and document root cause as part of a Quality Incident or Action Plan
7. Review training records and prepare a work authorization
8. Archive a testimony survey form upon approval
9. Prepare a request for approval of vendor(s) (as available)
10. Run QA Reports in LIMS
11. Perform an evidence reconciliation of a vault or location (optional)

B. Independent Exercises

1. Review 5 quality incident/action plan records from at least 5 laboratory locations



2. Complete the online Quality Assurance Standards (QAS) Auditor Training (<https://fbiva.fbiacademy.edu>) (as available for personnel involved with DNA) (Optional)
3. Complete the ISO Training/ANAB Assessor Training (as available)
4. Complete Internal Auditor training (as available)

15.4 Assessment

- A. The trainee must complete all required assignments. The trainee and trainer will complete the Advanced Quality Assurance Unit checklist. Conclusion of the module is determined by the trainer.
- B. Successful completion of the Advanced Quality Assurance Unit is mandatory for laboratory personnel in top management or key management positions. The trainee must complete all assignments within the Advanced Quality Assurance Unit to achieve a Certificate of Completion (LAB-308).



16 Advanced Evidence Handling

Duration 1 to 2 weeks

Purpose To familiarize the trainee with policies and procedures for receiving, returning, inventorying, destroying and transferring evidence

Prerequisite Fundamentals Unit

16.1 Objectives

A. Theoretical

The laboratory follows standards and requirements which address transportation, receipt, handling, protection, storage, retention, and disposal of evidence. Quality assurance principles and laboratory protocols are in place to maintain evidence integrity to ensure the quality of the test results.

This module is intended to be a more indepth training for Crime Laboratory Specialists (Evidence Coordination) covering the concepts, practices, and procedures associated with evidence handling, including:

1. Accountability for evidence at every step of handling and storage, from receipt through final disposition
2. Unique identification and tracking in such a way that items cannot be confused, either physically or when referred to in records
3. Inspection of packaging for proper seals and the documentation of discrepancies or departures from normal conditions
4. Procedures for avoiding deterioration, loss, or damage to the test item during storage, handling, and preparation
5. Customer requests and communication
6. Secure storage, with regard to specific environmental requirements, to protect the condition and integrity of items

B. Practical

Following the completion of training, the trainee will be able to:

1. Describe the policies related to security of evidence and limited access to the laboratory.
2. Identify aspects of the Laboratory Submission Form (LAB-201), Sexual Assault Evidence Submission Certification Form (LAB-206), Seized Drugs Destruction Only Submission Form (LAB-202), Toxicology Request Submission Form (LAB-203) and other documentation received with evidence.
3. Identify relevant evidence storage locations and evidence storage procedures within the laboratory.
4. Describe procedures for receiving, returning, destroying and transferring evidence with the LIMS system and the required documentation.
5. Complete documentation for receiving and returning evidence on paper using the evidence submission forms and with other documentation of disposition.



6. Associate the authorization required for the destruction of evidence including the review of the Order for Destruction of Toxicological Evidence forms.
7. Be authorized to use the balance to weigh evidence submitted for destruction only.

16.2 Training Outline

A. Lesson Plan

1. Evidence submission and receipt
 - a) *Methods of submission*
 - i. *In person*
 - ii. *Commercial courier (e.g. FedEx, UPS)*
 - iii. *U.S. postal service (e.g. regular US mail, certified mail)*
 - iv. *Deposits to secure lockbox*
 - b) *Review of submission form information (CLS – Receipt and Review of Laboratory Requests for Service)*
 - i. *Laboratory Submission forms*
 1. **Laboratory Submission Form (LAB-201)**
 2. **Seized Drugs Destruction Only Submission Form (LAB-202)**
 3. **Toxicology Request Submission Form (LAB-203)**
 4. **Biological Evidence Storage Form (LAB-204)**
 5. **Non-Reported Sexual Assault Evidence Laboratory Submission Form (LAB-205)**
 6. **Sexual Assault Evidence Submission Certification Form (LAB-206)**
 7. **Consent for Release of Sexual Assault Evidence Form (LAB-207)**
 8. **Sexual Assault Information Form (LAB-208)**
 9. **Digital/Multimedia Information Form (LAB-210)**
 10. **Gunshot Residue Kit Information Form (LAB-211)**
 11. **Expedited Analysis / Reanalysis Request Form (LAB-213)**
 - ii. *New, Additional, Resubmission, Corrected Copy*
 - iii. *Evaluation of the evidence and the requested testing services/types of analysis*
 - iv. *Clarification of discrepancies with the submission form and/or description or condition of the item(s) of evidence*
 - c) *Evaluation of evidence containers*
 - i. *Inspection of packaging, seals and labels*
 1. **Review evidence containers to identify potential tampering, loss, or alteration**
 2. **Recognize different types of stickers/labels that may be affixed to the evidence packaging, e.g. biohazard, glass, liquid, UN3373, IATA, etc**
 - ii. *Correlation of evidence items listed on submission form with container(s) received*
 - iii. *Containers for sharps, biohazards, fire debris, etc.*
 - iv. *Clear bags for seized drugs destruction only*
 - v. *Evidence containing a lithium battery*



- d) *LIMS entry (CLS – Evidence Processing, Receipt Procedure–General section; LIMS Manual)*
 - i. *Assignment of unique case number: evidence container(s) marked for traceability and unique identification*
 - ii. *LIMS entry of case information*
 1. **Recognition of various LIMS notifications upon case entry**
 2. **Creation of initial laboratory chain of custody on evidence items**
 - iii. *Ensure accurate chain of custody*
2. *Safety considerations while receiving evidence*
 - a) *Suspected fentanyl – Naloxone Nasal Spray kits*
 - b) *Sharps – place into laboratory provided container if not properly packaged*
 - c) *Liquid samples – labelling and proper storage*
 - d) *Lithium battery – separation of and proper storage*
 - e) *Firearm Safety – lab specialists may receive firearms safety training to be authorized to clear firearms*
3. *Evidence security (CLS – Evidence and Database Sample Integrity, Security and Storage of Evidence and Database Samples section)*
 - a) *Limited and controlled access areas*
 - b) *Short-term storage area(s)*
 - c) *Long-term storage area(s)*
4. *Transferring evidence*
 - a) *Inter-laboratory*
 - b) *Intra-laboratory*
 - c) *External laboratories (forwarding evidence to government and private laboratories)*
 - d) *Evidence Transfer Receipt*
5. *Disposition of evidence (CLS – Return of Evidence)*
 - a) *Evidence Ready to Return Report*
 - b) *Documentation*
 - c) *Methods of return*
 - i. *In person*
 - ii. *Commercial courier (e.g. FedEx)*
 - iii. *U.S. postal service (e.g. certified mail)*
 - d) *Evidence Return Receipt*
6. *Destruction of evidence (CLS chapter)*
 - a) *Authorization for destruction by internal DPS customers*
 - b) *Weighing of evidence submitted for destruction only*
 - i. *Balance training on operation, maintenance, and cleaning*



B. Supervised Performance

1. Identify all evidence storage locations, and demonstrate proper filing and retrieval of evidence
2. Utilizing a mock case number with mock evidence:
 - a) *Demonstrate the process of receiving evidence in LIMS.*
 - b) *Demonstrate the use of barcoding in LIMS.*
 - c) *Demonstrate intra-laboratory transfer of evidence.*
 - d) *Demonstrate inter-laboratory transfer of evidence with the necessary documentation and proper entry of the actions in LIMS.*
 - e) *Demonstrate the return of evidence in LIMS by various methods.*
3. Demonstrate proper documentation of corrections and customer communications.
4. Demonstrate the use of the balance for weighing of destruction only cases.

16.4 Assessment

- A. The trainee must complete all assignments. The Advanced Evidence Handling Checklist is completed by the trainee and trainer. Successful completion of this module is determined by the trainer.
- B. The trainee will complete a written examination. Incorrect responses will be reviewed and remediated with the trainee.



PART IV FORMS

17 Directory of Forms

Document Name	FRN
GLT: Fundamentals Unit Checklist	LAB-GLT-01
GLT: Forensic Legal Unit Checklist	LAB-GLT-02
GLT: Measurement Uncertainty Checklist	LAB-GLT-03
GLT: Advanced Quality Assurance Checklist	LAB-GLT-04
GLT: Advanced Evidence Handling Checklist	LAB-GLT-05
Workplace Safety Exercise	LAB-GLT-06
General Safety Exercise	LAB-GLT-07
Legal Terms Exercise	LAB-GLT-08
Measurement Uncertainty Review Exercise	LAB-GLT-09