## MASTER DOCUMENT LIST

### Overview of General Laboratory Training Unit

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| 03        | 03/04/2016     | New: GLT-TM-QA-01, LAB-GLT-09
Rescinded: GLT-TM-01B, GLT-TM-01C |
| 04        | 03/11/2016     | New: LAB-GLT-10               |
| 05        | 06/15/2016     | Revised: GLT-TM-FUN-04        |
| 06        | 07/28/2016     | Administrative Revision: LAB-GLT-01 |
| 06a       | 03/20/2017     | Version numbers removed from MDL |
OVERVIEW OF GENERAL LABORATORY TRAINING PROGRAM

1 Introduction

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. Topics covered in this system training manual begin with new employee orientation and proceed to cover laboratory safety, evidence management, laboratory information management system, ethics and professionalism, quality assurance, court testimony, and measurement uncertainty. Modules may not be relevant to all job positions.

This manual is required training for new hires and those who enter into a new role after the effective date, e.g. someone who was in a technician role then promotes to an examiner or an examiner in one discipline who becomes competent in another discipline but has not previously completed the General Laboratory Training (GLT).

2 Requirements

All employees shall have the minimum qualifications detailed in the approved job descriptions maintained by Human Resources.

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.

3 Purpose

The General Laboratory Training manual is designed to assist the trainee, especially a new employee, to acquire additional background information, skills, and supervised hands-on experience to better perform assigned duties within the DPS Crime Laboratory. All employees share the common goal of providing quality forensic laboratory services to the citizens of Texas in cooperation with Texas law enforcement agencies. Training may be adjusted with approval from the Quality Assurance Coordinator on a case-by-case basis depending on the trainee’s skills, knowledge, job duties and prior work experience.

This training manual and the controlled documents, quality records, and training references cited within it, should be accessed from a DPS network computer.

4 Introduction to the DPS Laboratory General Laboratory Training

Key Concepts

A. The General Laboratory Training modules may be completed in any order, except for any prerequisite(s) required by the module.

B. 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.

Fundamentals Unit introduces the trainee to general laboratory practices and agency policies, laboratory safety, evidence management, ethics, and quality assurance.

New Employee Orientation module (GLT-TM-FUN-01) introduces the trainee to the overall operation of the Texas DPS and the Crime Laboratory System at the most basic level.
General Safety module (GLT-TM-FUN-02) describes the agency’s safety program, including administrative controls, engineering controls, work practices, and personal protective equipment. [NOTE: Optional additional firearms training can be requested from the Firearms Section; completion of this module does not authorize an individual to handle firearms] [NOTE: This unit is not a substitute for a first aid course.]

Forensic Science and Evidence Management module (GLT-TM-FUN-04) provides a broad overview of the many forensic science disciplines and introduces the trainee to concepts of work integrity, proper seals, chain of custody, and the laboratory information management system (LIMS). This module is optional for Breath Alcohol. CODIS personnel are not required to complete the Evidence Management portion of the module.

Ethics and Professionalism module (GLT-TM-FUN-05) focuses on the policies and ethics statements that all employees are expected to follow.

Introduction to Quality Assurance module (GLT-TM-FUN-06) 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.

Forensic Legal Unit includes basic court testimony, an overview of the court structure and legal opinions of particular significance to forensic laboratories.

Overview of the Legal Process and Testimony module (GLT-TM-LAW-01) 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.

Rules of Evidence and General Legal Opinions module (GLT-TM-LAW-02) provides the trainee with a thorough grounding in the rules of evidence for expert witnesses and significant rulings which impact scientific testimony.

Discipline Specific Legal Opinions Appendix (GLT-TM-LAW-02A) is optional supplemental material which provides discipline-specific legal opinions.

Measurement Uncertainty Unit introduces the basic concepts of uncertainty for reported measurements. The Measurement Uncertainty Unit is mandatory for testifying laboratory personnel in the Blood Alcohol, Breath Alcohol, Controlled Substances, Firearms/Toolmarks, and Toxicology disciplines. It is strongly recommended for testifying laboratory personnel in the Trace Evidence, Latent Prints, DNA, and Questioned Documents disciplines.

Measurement Uncertainty module (GLT-TM-UNC) 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.

Advanced Quality Assurance Unit is mandatory for laboratory personnel in top management or key management positions.

Advanced Quality Assurance module (GLT-TM-QA-01) familiarizes the trainee with advanced topics in quality assurance.

5 Trainer Responsibilities

The trainer is responsible for training, evaluating, and documenting the trainee’s progress, planning future study and practical assignments, and discussing any deficiencies with the
trainee which require additional training. Meetings between the trainee and the trainer and/or supervisor should be held at least weekly in order to ensure robust training. See Employee Training Program (LOG-07-01).

6 Trainee Responsibilities

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

7 Training Notebook

A. During the training program, the trainee is responsible for keeping his/her detailed, labeled training records in a training notebook.

B. Upon completion of training, the notebook must be archived electronically. Therefore, staples must not be used, and tab information from dividers which cannot be rolled through the scanner should be conveyed instead on a page of printer paper acceptable for scanning. The items to be maintained in the training notebook are described below.

1. General laboratory training checklists must be used with the corresponding modules. The Training Record form (LAB-QA-28) or a comparable record may be used in conjunction with the checklists.

2. Supplemental documentation to the checklists must be kept by the trainee to document literature readings and training videos not included on the checklists.

3. Any exercise, competency, or examination performed by the trainee will be documented and include trainer initials and date. Instructions, purpose, summary results, evaluations, and remediation should be evident.

4. A log of courtroom testimony, workshops, courses, or other events attended and observed for training will be completed (if applicable).

8 Unit Assessments

The training notebook, other training records documenting completion of training requirements, and trainee's credentials are reviewed by the Quality Manager and the Quality Assurance Section.

A. Fundamentals Unit and Forensic Legal Unit

1. Successful completion of the assigned module(s) in the Fundamentals Unit is mandatory for all laboratory personnel. Upon completion of applicable modules within the Fundamentals Unit, a Certificate of Completion form (LAB-QA-31) will be submitted.

2. Successful completion of the assigned module(s) in the Forensic Legal Unit is mandatory for examiners, technical support, and managerial personnel. Upon completion of applicable modules within the Forensic Legal Unit, a Certificate of Completion form (LAB-QA-31) will be submitted.

B. Measurement Uncertainty Unit

Upon completion of GLT-TM-UNC, a Certificate of Completion form (LAB-QA-31) will be submitted.
C. Advanced Quality Assurance Unit

Upon completion of GLT-TM-QA-01, a Certificate of Completion form (LAB-QA-31) will be submitted.

D. Evaluation of training program by trainee

The Laboratory Training Program Evaluation Form (LAB-QA-21) is to be completed and submitted to the Quality Assurance Coordinator.
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| 01        | 06/30/2011     | Major Revision – Sections 3, 4, and 8  
Minor Revision – Sections 1, 2, 5, and 7  
Committee recommendations |
| 02        | 03/04/2016     | Major Revision – All sections  
Committee recommendations |
| 03        | 08/20/2018     | Major Revision – Sections 1, 4, 5, 7, and 8 |
### GENERAL LABORATORY TRAINING UNITS MATRIX

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**Key:**

- **ADM:** Administrative Support Staff
- **MT:** Managerial Team
  - Forensic Scientist V
  - Technical Leader
  - Manager/Supervisor
  - Quality Assurance Staff
  - Program Specialists and Coordinators
  - Director
- **EX:** Examiners
  - CODIS Analyst
  - Forensic Scientist I-IV
- **TECH:** Technical Support
  - Crime Lab Specialist (Evidence Technician, QC/DNA Technician)
  - Latent Print Examiner
  - CODIS Technician

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**Effective Date:** 08/20/2018

**Issued by:** QA Coordinator
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<td>03</td>
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<td>Major Revision – General Laboratory Training Unit Matrix</td>
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NEW EMPLOYEE ORIENTATION

Duration 2 to 4 days

Purpose Provide an orientation to the Texas Department of Public Safety and the Crime Laboratory System.

Prerequisite Department of Public Safety New Employee Agency Orientation

1 Objectives

1.1 Theoretical

All employees must participate in a Texas Department of Public Safety formal orientation. This training will continue when the employee arrives at their assigned duty station. As a new employee, it is important to become acquainted with the written directives, orders, and other information necessary to ensure effective operation of the Crime Laboratory as well as the Texas Department of Public Safety as a whole. The DPS General Manual, the Crime Laboratory’s Laboratory Operations Guide (LOG), and other human resource publications provide new employees with valuable information and instruction on which to build their careers and conduct themselves daily.

1.2 Practical

Following the completion of training, the trainee will:

Be familiar with the overall organization and operations of the Texas Department of Public Safety (DPS) and the Crime Laboratory System, including:

- The objectives and missions of the DPS and Crime Laboratory
- The organization and chain of command in the DPS and in the Crime Laboratory
- The locations of the DPS laboratories throughout the state
- The DPS General Manual and the Laboratory Operations Guide (LOG), including electronic access

Complete the New Employee Orientation-Packet (HR-26), which certifies review of departmental policy

Complete an electronic timesheet and become familiar with leave codes

Be familiar with expected conduct and attitude-related behaviors for job performance

If applicable to their position, new employees will receive instruction on the proper use of vehicle gas cards. Also if applicable, employees may submit a completed application for a travel credit card and a signed Travel Card Use Agreement form (ACT-66).

If applicable, new employees will become familiar with the fleet vehicle use procedure.

2 Training Outline

2.1 Lesson Plan

A. Complete DPS New Employee Orientation Packet

B. Participate in Division Orientation

C. Introduction to Duty Station

1. Introduction to management and coworkers
2. Tour of the assigned duty station facility
3. Work Hours
4. Facility Security and Procedures

D. General Office Practices, Equipment, and Resources
1. Telephones, Paging Systems, Faxes, Copiers, Scanners
2. Computers
3. Supplies
4. Business Cards
5. Contact information for building maintenance, IT help, security, HR, etc.

E. Overview of DPS Operations [DPS General Manual]
1. Introduction to the DPS General Manual (Chapter 1)
2. Laws creating and controlling the Texas Department of Public Safety (Chapter 2)
3. Organization and Administration (Chapter 3)
4. Objective, Mission and Program (Chapter 4)
5. Doctrines, Policies, and Operating Procedures (Chapter 5)
   a) budgetary/managerial suggestions
   b) use of tobacco
   c) gift solicitation
   d) evacuation plans for department occupied facilities
   e) computer security
6. Professional Conduct and Ethics (Chapter 6)
7. Personnel Policies, Procedures, and Benefits (Chapter 7)
   a) temporary disability leave without pay
   b) sick leave
   c) vacation entitlement
   d) holiday schedule
   e) FLSA and compensatory equivalent overtime
   f) emergency leave
   g) jury duty
   h) promotion and selection policy and procedure
   i) transfer policy and procedure
   j) secondary employment of noncommissioned officers
   k) DPS Mutual Insurance policy
   l) personal information
m) 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.]

c) personnel performance evaluation and probationary period

d) employment-related grievance

e) additional DPS policies are found in HR publications HR-42 and HR-166, which should be received during DPS general agency orientation

8. Comprehensive Department Safety Program (Chapter 8)

a) hazard communication program

b) use of tobacco

c) drug-free workplace policy

d) workers compensation

e) work-related exposure to infectious disease

9. Fiscal and Property Procedures (Chapter 10)

a) salary deductions, adjustments, and authorizations

10. Communications and Motor Vehicle Fleet Operations (Chapter 11)

a) telephone services

b) as applicable, car radio protocol and operation

c) motorpool operations

d) fleet incident or accident

11. Building Use and Energy Conservation (Chapter 16)

12. Equal Employment Opportunity Policy (Chapter 18)

13. Records and Information Policies (Chapter 21)


a) 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.

i. vehicle operation (including 24 hour reserved parking)

ii. general employee information for the emergency evacuation of Headquarters facilities

iii. emergency first aid

iv. Headquarters security plan

15. Information Management Service (Chapter 26)
16. Agency Contracts and Procurements (Chapter 28)

F. Travel
   1. Forms and allowances
   2. Credit cards (Travel and Procurement)

G. Release of Information and the Public Information Act
   1. DPS General Manual Chapters 5 and 21
   2. Conditional Release of Records and Information (LOG-04-04)
   3. Public Information Act

H. Overview of DPS Crime Laboratory
   1. General history of the DPS Crime Laboratory
   2. DPS General Manual Chapter 20
   3. Crime Laboratory Overview (LOG-01-01)
   4. Organizational Charts
   5. Management System (LOG-01-02)
   6. Physical Evidence Handbook (PEH-01-01 through PEH-01-03)
      a) Laboratory Addresses
   7. Service Area Maps

I. Employment
   1. Employee Training Program (LOG-07-01)
   2. Performance Plan (General Manual Chapter 7)
   3. Employee Career Development (LOG-07-03)
   4. Conditions of Employment (LOG-07-04)
   5. Attire and Appearance (LOG-01-06)

2.2 Required Readings
Texas Department of Public Safety, *DPS General Manual*, cited information
Texas Department of Public Safety, Crime Laboratory, *Labaratory Operations Guide (LOG)*, cited information
Texas Department of Public Safety, Crime Laboratory, Physical Evidence Handbook (PEH), cited information

2.3 Suggested Readings
Texas Department of Public Safety *Employment Discrimination Workbook for New State Employees (EEO-5)*
Texas Department of Public Safety *Employee Handbook (HR-166)*

3 Practice
3.1 Exercises
Complete the New Employee Orientation Packet (HR-26). The documents required in the New Employee Orientation Packet (HR-26) must be submitted to HR.

Discuss mission, organization, and additional expectations for the job

Review the Performance Plan with Supervisor

Tour assigned duty station facility including introductions, safety devices, SDS, hazards, security, and evacuation route

Review use of phone system features

If applicable, review vehicle use procedure and policy

If applicable, complete application for travel credit cards

Complete EEO New Hire and Compliance Online Training

Complete Documentation, Preservation, Disclosure of Evidence Online Training

Complete Records Management Online Training

Complete SANS Securing the Human Security Awareness Online Training

4  Assessment

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

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

Duration  
2 to 3 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  
GLT-TM-FUN-01 New Employee Orientation

1 Objectives

1.1 Theoretical

DPS Laboratory personnel face potential occupational exposure to hazardous materials and chemicals and/or infectious diseases from body fluids. 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.

1.2 Practical

Following the completion of training the trainee will:

- Be familiar with general laboratory safety principles and agency and laboratory policies.
- Be familiar with different types of PPE and how to use each one.
- Be aware of firearm evidence safety. [NOTE: Optional additional firearms training may be requested from the Firearms Section.]
- 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.
- Be able to locate fire warning devices, fire safety equipment, evacu chairs in multi-story laboratories, and building exits specific to the work area, and know how to respond to the device signal.
- Identify the location of any laboratory duress buttons.
- Be familiar with emergency procedures and designated safe meeting location(s).
- Acknowledge that they have been informed of Right to Know information.
- Be able to interpret labels, use a safety data sheet (SDS) and locate SDSs from local SDS collections and online SDS sites.
- Be familiar with proper separation and storage of chemicals and spill response procedures.
- Be familiar with standard precautions/Universal Blood Precautions and sharps safety protocol.
- Identify the laboratory’s safety advisor and personnel trained in CPR or First Aid.
2 Training Outline

2.1 Lesson Plan

A. Administrative Controls

1. Safety philosophy, scope, and responsibility (DPS General Manual Chapter 8)

2. Chemical Hazards – (Laboratory Safety Pocket Handbook, SAF-03-01, Chemical inventory for local laboratory)

3. 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.]

4. Chemical container labels

   a) United Nations’ Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and GHS Safety Data Sheets (SDS)

   b) NFPA panel (Diamond-shaped sign)
<table>
<thead>
<tr>
<th>Health Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
<tr>
<td>Very short exposure could cause death or serious residual injury even though prompt medical attention was given.</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Exposure could cause irritation but only minor residual injury even if no treatment is given.</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Flammability</th>
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<tbody>
<tr>
<td>4</td>
</tr>
<tr>
<td>Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Liquids and solids that can be ignited under almost all ambient conditions.</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>Must be moderately heated or exposed to relatively high temperature before ignition can occur.</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Must be preheated before ignition can occur.</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Materials that will not burn.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instability</th>
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</thead>
<tbody>
<tr>
<td>3</td>
</tr>
<tr>
<td>Readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>Capable of detonation or explosive reaction, but requires a strong initiating source or must be heated under confinement before initiation, or reacts explosively with water.</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Normally stable, even under fire exposure conditions, and are not reactive with water.</td>
</tr>
</tbody>
</table>
Special Hazards

| OX | This denotes an oxidizer, a chemical which can greatly increase the rate of combustion/fire. |
| SA | This denotes gases which are simple asphyxiants. The only gases for which this symbol is permitted are nitrogen, helium, neon, argon, krypton, and xenon. The use of this hazard symbol is optional. |
| W | Unusual reactivity with water. This indicates a potential hazard using water to fight a fire involving this material. When a compound is both water-reactive and an oxidizer, the W/bar symbol should go in this quadrant and the OX warning is placed immediately below the NFPA diamond. |

c) HMIS bar (Review HMIS Safety Symbols)

- Chemical Name
  - HEALTH
  - FLAMMABILITY
  - PHYSICAL HAZARD
  - PERSONAL PROTECTION

2. Biological hazards (universal precautions, hepatitis vaccination) (SAF-04-01),

- Universal Biohazard Label

3. Emergency response (chemical, biological, mercury spills and gas leaks, bomb threats, evacuation plans) (SAF-05-02 to SAF-05-06, General Manual Chapter 5)

4. Routine safety inspections (SAF-06-01 and LAB-SAF-01)

5. Firearms safety (SAF-01-06)

B. Engineering controls, location in lab, and proper use as applicable

1. Laboratory design (evacuation routes, isolation of hazards)

2. Fire detection and warning devices (includes location of all devices in the laboratory, evacuation routes, and meeting places during fire drills)
3. Chemical and Biological hoods (SAF-01-05)
4. Chemical storage (SAF-03-01)
5. Gas cylinder restraint (SAF-01-07)
6. Cryogenics safety (conditional – job function dependent; SAF-01-07)
7. Radiation safety (SAF-02-01) (conditional – job function dependent)
8. Eyewash/Emergency shower (SAF-01-04)
9. Duress buttons

C. Work practices
1. General housekeeping (clean, free of obstructions, clearly marked) (SAF-01-01)
2. Chemical/Biological safety (don’t work alone, odors, no food and drinks in lab) (SAF-01-01)
3. Personal Hygiene (hand washing, inhalation, mouth-pipetting) (SAF-01-01)
4. Handling sharps (SAF-04-01)
   a) The safest way to dispose of a used needle is to immediately place it in a sharps disposal container to reduce the risk of needle sticks, cuts and punctures from loose sharps. However, if the syringe is evidence, it must be safely returned to the evidence packaging. Ideally the syringe should be submitted in a syringe transport tube, so the evidence should be returned to that tube or placed into a laboratory-provided syringe transport tube.
   b) If you need to put the cap back on the needle (recap), do not bend or break the needle and never remove a hypodermic needle from the syringe by hand. This may result in accidental needle sticks, cuts or punctures. Recapping should be performed using a mechanical device or the one-handed technique which consists of 3 steps outlined below.
      i. Step 1: Place the cap on a flat surface like the table or counter with something firm to "push" the needle cap against
      ii. Step 2: Holding the syringe with the needle attached in one hand, slip the needle into the cap without using the other hand
      iii. Step 3: Push the capped needle against a firm object to “seat” the cap onto the needle firmly using only one hand.
5. Waste treatment (autoclaves, incinerators) (SAF-04-01)

D. Personal Protective Equipment (PPE) (SAF-01-02, SAF-01-03)

2.2 Required Readings

Texas DPS Crime Laboratory Safety Manual entirety
Texas Department of Public Safety General Manual cited information
All employees are required to read the DPS General Manual; however, this module will only focus on the following chapters:

<table>
<thead>
<tr>
<th>General Manual Reference</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Ch. 5</td>
<td>Evacuation plans for department occupied facilities</td>
</tr>
<tr>
<td>Ch. 5</td>
<td>Response to bomb threats</td>
</tr>
<tr>
<td>Ch. 5</td>
<td>Using a fire extinguisher</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Safety Practices Policy</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Hazard communication program</td>
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<tr>
<td>Ch. 8</td>
<td>Labels</td>
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<tr>
<td>Ch. 8</td>
<td>SDS</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Workplace chemical list</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Workers compensation forms</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Work-related exposure: Employees exposed to communicable diseases</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Information on AIDS</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Guidelines for payment of expenses associated with exposure to infectious disease</td>
</tr>
<tr>
<td>Ch. 8</td>
<td>Reporting work-related injuries and infectious disease exposures</td>
</tr>
<tr>
<td>Ch. 13</td>
<td>Emergency and Disaster Functions</td>
</tr>
</tbody>
</table>

NIOSH Pocket Guide to Chemical Hazards

2.3 Videos

Trainee will be required to observe safety videos that will be assigned by the trainer. Topics may include, but are not limited to, the following:

1. Chemical safety
2. Biological safety
3. Confined spaces
4. Heavy lifting procedures
5. Spill clean-up procedures
6. Proper syringe handling

These videos may be viewed at a later date during annual laboratory safety training.

Training videos are available from the Texas Department of Health Audiovisual Library and from the TXDPS Training Academy Library.
3 Practice

3.1 Independent Exercises

Complete Workplace Safety Exercise (LAB-GLT-02).

Begin the Hepatitis B vaccination series within 10 days of training on occupational exposure to Hepatitis B or complete the Hepatitis B Vaccination Declination form (LAB-SAF-02). (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.) An employee who declines the vaccine may change their decision and request the vaccine at any time. 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.

Complete the online Narcan Administration Training.

Complete the online Bloodborne Pathogens Training.

4 Assessment

4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

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

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<td>Major Revision – All sections Committee recommendations</td>
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<td>08/20/2018</td>
<td>Major Revision – All sections</td>
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FORENSIC SCIENCE AND EVIDENCE MANAGEMENT

Duration 3 to 5 days

Purpose To orient and acquaint the trainee with a brief overview of the disciplines of forensic science. To familiarize the trainee with the concepts and practices of evidence integrity, security, proper seals, thorough documentation, and chain of custody. To familiarize the trainee with the Laboratory Information Management System (LIMS).

Prerequisites GLT-TM-FUN-01 New Employee Orientation; GLT-TM-FUN-02 General Safety

1 Objectives

1.1 Theoretical

Understanding the field of forensic science is fundamental to the crime laboratory personnel who have routine access to case records, evidence, and laboratory analysis 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, scope of forensics, and the roles of the forensic scientist and other laboratory personnel.

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, whether at a crime scene or in the laboratory, to recognize and preserve its potential evidentiary value for all disciplines.

1.2 Practical

Following the completion of training the trainee will:

Be able to define forensic science.

Be familiar with the roles of the forensic scientist and other laboratory personnel.

Be familiar with the forensic historical point of view: the individuals and their specific contributions to formulating the disciplines that now constitute forensic science.

Be familiar with the major disciplines in forensic science and at DPS.

Be familiar with the definition of physical evidence and common types of physical evidence examined.

Be familiar with the concepts of evidence integrity and chain of custody.

Be familiar with the concept of the security of evidence in the laboratory, by means of limiting access, secure storage lockers and evidence seals.

Be familiar with proper techniques of sealing evidence, marking for identification and individual packaging of items.

Be familiar with the Laboratory Information Management System (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.

Be familiar with documentation for receiving and returning evidence on paper using the evidence submission forms and with other documentation of disposition.

Be familiar with the authorization required for the destruction of evidence.

Be familiar with the distinction between long-term and short-term storage.

Be familiar with precautions taken to prevent contamination during evidence handling.

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.

Be aware of and know how to evaluate any hazardous attributes of evidence items.

2 Training Outline

2.1 Lesson Plan

A. Introduction to Forensic Science (Saferstein: Introduction to Forensic Science-Ch 1)

1. Definition and scope of forensic science
2. History and development of forensic science
3. Organization of a crime laboratory (models)
4. Services of a crime laboratory
5. Functions of the forensic scientist
6. Locard’s transfer/exchange principle
7. Conclusions - assessing the strength of the evidence

B. Definitions Glossary (LOG-09-01)

C. Review of Laboratory Services

1. Statement of services (LOG-01-01, PEH-01-02)
   a) DPS Laboratory customers
   b) Contract with customer

2. Scope of Forensic Testing services (PEH-01-03)
   a) Latent Prints/AFIS (PEH-02-06)
   b) Questioned Documents/Digital Evidence (PEH-02-07, PEH-02-08 and PEH-02-11)
   c) Controlled Substances/Drugs (PEH-02-02)
   d) Biological Screening/DNA (PEH-02-04)
   e) Firearms and Toolmarks/NIBIN (PEH-02-09 and PEH-02-10)
   f) Toxicology/Blood Alcohol (PEH-02-03)
   g) Trace Evidence (PEH-02-05)
3. Scope of Breath Alcohol Calibration services
   a) Instrument Calibration
   b) Certified Reference Material (CRM) Calibration

4. Quality Policy Statements (LOG-01-01A)

2.2 Evidence Handling and Management (optional for CODIS and Breath Alcohol)

A. Common types of physical evidence and conditions detrimental to evidence
   1. 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]
   2. Chemicals [heat, leaky containers leading to cross contamination or loss including evaporation of volatiles]
   3. Botanicals [mold, obliteration of microscopic evidence, introduction of artifacts]
   4. Weapons/ammunition [obliteration of marks in soft metal]
   5. Surfaces [careless handling which obliterates or contaminates DNA, obliterates fingerprints or microscopic evidence, or introduces artifacts]
   6. Documents [obliteration of impressions and latent prints, introduction of artifacts, damage to fragile evidence]
   7. 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]
   8. Impressions and Toolmarks [obliteration of marks in paper, soft metal, wood, dirt, snow, etc, introduction of randomly acquired characteristics]
   9. Fibers, glass, hair, paint, soil [obliteration of microscopic evidence introduction of artifacts]
   10. 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]
   11. 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]

B. Significance of physical evidence
   1. identification
   2. comparison
      a) class characteristics (classification)
   3. individual characteristics (individualization) elimination and inclusion
4. location

C. Responsibilities of the crime laboratory for evidence integrity (ISO/IEC 17025 and Supplemental Requirements, LOG-05-01)

1. Prevention of loss, contamination, and changes in quality during collection, packaging, testing, and storage across all of the disciplines and other agencies (PEH 02-01)
   
a) Spoliation (willful destruction of evidence or the failure to preserve potential evidence for another's use in pending or future litigation) of scene and evidence
   
b) Evidentiary value and order of collection/testing
      
i. Discussion of probative value as evidence for each discipline
      
ii. Discussion of the evidence’s significance to the case with law enforcement investigators
   
c) Crime scene practices as potential for contamination
   
d) Precautions to be taken during evidence searches and analyses
      
i. Single case/sample handling
      
ii. Separating evidence from reference samples
      
iii. Preparing work surface areas
      
iv. Frequent glove changes
      
v. Cleansing tweezers, scissors and tools

2. Collection, packaging, testing, and storage procedures to preserve and prevent further deterioration (PEH 03-02)
   
a) General instructions
   
b) Biological evidence
      
i. Storage temperature
      
ii. Drying
      
iii. Isolation
   
c) Botanical evidence
      
i. Drying
      
ii. Combustion risk
         
Spontaneous combustion of moisture-containing bales
Evidence soaked with a volatile liquid
   
d) Digital/multimedia evidence
   
e) Document evidence

3. Proper evidence seals (see definition for “properly sealed” within LOG-09-01)

4. Maintain intact chain of custody (ISO/IEC 17025 and Supplemental Requirements)
a) **Evidence submission and receipt**

Case/Calibration Record (LOG-04-01)

Evidence Control (LOG-05-01)

Instructions - Receiving NIBIN-Only Test Fires (LOG-05-01C)

Instructions for Evidence Received by Email (LOG-05-01D)

Physical Evidence Handbook (PEH 02-02 through 02-10)

i. **Methods of submission:** in person, commercial courier, U.S. postal service, deposits to secure lockbox, via laboratory crime scene search.

ii. **Evaluation of submission form information, including whether it is a new case, resubmission, or additional evidence**

iii. **Evaluation of packaging and seals**

iv. **Assignment of unique case number**

v. **Marking of evidence for traceability and unique identification**

Outermost container identification (by officer/agency, evidence tech, examiner)

Inner container(s) identification

vi. **Maintain records regarding quality and laboratory actions upon evidentiary items. Use of following forms:**

   - Laboratory Submission Form (LAB-06)
   - Sexual Assault Evidence Submission Certification (LAB-06A)
   - Laboratory Information Sheet (LAB-08)
   - Toxicology/Blood Alcohol Kit Laboratory Submission (LAB-12)
   - Instructions for the Collection and Submission of Blood Specimens for Alcohol and /or Drug Determinations (LAB-12b)
   - Instructions for the Collection and Submission of Urine Specimens for Drug Determinations (LAB-12u)
   - Toxicology Alcohol and Drug Analysis Lab Contacts (LAB-12sa)
   - Gunshot Residue Kit Info Form and Instructions (LAB-17 and LAB-17A)

b) **Computer data entry (LIMS Manual)**

c) **Barcoding containers**

i. **LIMS (LOG-05-01, LOG-08-01)**

ii. **Subsequent barcoding and data entry of subdivided or derived samples originating from barcoded sample**

iii. **Record of history for time, custody, and location**
d) Transfer of evidence
   i. Inter-laboratory
   ii. Intra-laboratory
   iii. External laboratories (forwarding evidence to government and private laboratories)
   iv. Barcoding

e) Creating an audit trail to track cases and evidence

f) Evidence Security - Prevention of tampering and theft (LOG-02-01) (LOG-02-02)
   i. Limited access
      • building
      • vault(s)
      • authorized personnel
   ii. Short-term storage
   iii. Long-term storage
   iv. Evidence inventory

g) Disposition and destruction of evidence [Evidence Destruction (LOG-05-02); Destruction of Hazardous Chemicals (LOG-05-03)]
   i. Methods of return: in person, U.S. mail, courts, commercial courier.
   ii. Authorization for destruction varies based on type of evidence (letter, court order, CID-32 DPS Form)
   iii. Documentation (case record, incinerator weight log, destruction list)
   iv. Computer data entry, barcoding (return, court, destruction, etc)
   v. Submission of evidence into court (examiner brings evidence to court and the evidence is introduced into court and retained by court)
   vi. Extended retention in the laboratory (evidence submitted by DPS law enforcement)

5. Evidence Quality
   a) Evidence Vault Inspection (LOG-05-04)
   b) Evidence Inspection Form (LAB-QA-06)

2.3 Required Readings


Laboratory Operations Guide (LOG), as cited
ASCLD/LAB-*International* Supplemental Requirements


Saferstein, Richard *Criminalistics: An Introduction to Forensic Science*, current edition Prentice-Hall, Inc. (Chapter 1, “Introduction” and Chapter 3, “Physical Evidence”). [Examiner trainee must also read chapters relevant to their assigned discipline.]

Texas Department of Public Safety Crime Laboratories, *Physical Evidence Handbook*, as cited

### 2.4 Suggested Readings

Texas Department of Public Safety Crime Laboratories, *Laboratory Information Management System Manual (Justice Trax)*

### 3 Practice

#### 3.1 Safety

Safety glasses or 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.

#### 3.2 Observed Performance (optional for CODIS and Breath Alcohol)

- **A.** The trainee will observe evidence coordination personnel receiving evidence from and returning evidence to submitting officials, and transferring evidence to different sections of the laboratory.
- **B.** The trainee will observe analysts opening, examining, marking, sealing and storing evidence in different sections of the laboratory.
- **C.** Discuss all types of evidence and the security of evidence, limited access, evidence seals, secure storage locations, and proper storage conditions.

#### 3.3 Supervised Performance (optional for CODIS and Breath Alcohol)

The trainee will:

- **A.** Demonstrate proper sealing of an envelope, paper bag and cardboard box.
- **B.** Search the case record in LIMS (Justice Trax or STaCS) for custody, location and other information.

### 4 Assessment

#### 4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

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

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ETHICS AND PROFESSIONALISM

Duration ½ to 1 day

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

Prerequisite GLT-TM-FUN-01 New Employee Orientation

1 Objectives

1.1 Theoretical

Ethical decisions and ethical behavior as a DPS Crime Laboratory employee are of critical importance to the credibility and functionality of the whole laboratory. The trainee will review the policies and ethics statements of the State of Texas, the DPS, and ANSI-ASQ National Accreditation Board (ANAB).

1.2 Practical

Following the completion of training the trainee will:

- Engage in interactive forensic science scenarios
- Be familiar with the DPS Ten General Orders.
- Be familiar with the five standards of conduct for the State of Texas employees.
- Be familiar with guidelines to job success.

2 Training Outline

2.1 Lesson Plan

A. Ethical Codes of Organizations and Entities

1. Ethics Laws for Texas State Officers and Employees
   a) Standards of Conduct and Conflict of Interest. The Legislature has adopted the following standards of conduct for state employees: State Ethics Guides
      i. Online Ethics Training [view TEC ethics training presentation]
   b) Perjury and Other Falsification, Texas Penal Code Ch 37
      i. Definitions: Perjury, Aggravated Perjury
      ii. Tampering with Governmental Record

2. Texas DPS Policies
   a) General Manual
      i. Review DPS Ten General Orders (General Manual Chapter 1)
      ii. Review Standards of Ethical Conduct (General Manual Chapter 6)
   b) LOG
      i. Laboratory Personnel (LOG-01-01)
      ii. Conflict of Interest and Constraints (LOG-01-01)
iii. **Quality Policy Statement (LOG-01-01A)**

3. ANSI-ASQ National Accreditation Board Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel


B. Strengthening Forensic Science in the United States: A Path Forward

C. Ethics in the Forensic Sciences (PowerPoint Presentation by Dan B. Grunnell)

D. Ethics in Forensic Science (Chapters 3 and 13)

E. Professionalism: “Start Right...Stay Right” handbook

F. Whistleblower: Protection for Reporting Violations of Law, the “Whistleblower Act”, Texas Government Code 554

G. Texas Forensic Science Commission Policies and Procedures

H. Role of forensic science in wrongful convictions

2.2

A. **Required Readings**

ANSI-ASQ National Accreditation Board Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel


Laboratory Operations Guide, as cited


Texas Department of Public Safety General Manual, as cited

Texas Ethics Commission. A Guide to Ethics Laws for State Officers and Employees,


3. **Whistleblower: Protection for Reporting Violations of Law, the “Whistleblower Act”, Texas Government Code 554**

3.1 **Independent Exercises**

The trainer may opt to assign supplemental work to the trainee from the General Training Resource documents or other sources.
Complete the online ethics training quiz from the Texas Ethics Commission.

4 Assessment of Training

4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

The trainer may opt for the trainee to complete a written exam.
Subject: Ethics and Professionalism

Effective Date: 08/20/2018
Issued by: QA Coordinator

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INTRODUCTION TO QUALITY ASSURANCE

Duration 1 to 2 days

Purpose Familiarize trainee with the principles of quality assurance as they apply to forensics

Prerequisite GLT-TM-FUN-01 New Employee Orientation

1 Objectives

1.1 Theory

The ability to understand and apply proper quality assurance practices is essential to the process of forensic analysis. Knowledge of forensic advisory boards, scientific/technical working groups, and other governing bodies from local to national levels is important. 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.

1.2 Practical

Following the completion of training the trainee will:

Understand the basic principles of quality assurance.

Be familiar with the legal mandate for accreditation and oversight.

Be familiar with the accreditation process.

Be familiar with the elements involved in demonstrating lab competence, product quality, and assessing individual competence.

Be familiar with professional associations which offer guidance/standards for analysis and training.

2 Training Outline

Some sections are identified as dependent on job function and may not be required.

2.1 Lesson Plan

A. Definitions

1. **Quality**: Suitability for use; the degree to which a set of inherent characteristics fulfills requirements

2. **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

3. **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

4. **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
5. **Quality Manual**: The LOG is considered to be the quality manual for the laboratory. It contains laboratory policies and defines quality processes/practices.

6. **Quality Policy**: The overall intentions and direction of an organization related to quality as formally expressed by top management.

7. **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.

8. **Competency Test**: The evaluation of a person’s ability to perform work in any functional area prior to the performance of independent casework.

9. **Proficiency Test**: A test to evaluate the continuing capability of analysts, technical support personnel and the performance of a laboratory; in open tests, the analysts and technical support personnel are aware that they are being tested; in blind tests, they are not aware.

10. **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 Code of Criminal Procedures, Section 38.01 4-d.

B. Outline of Laboratory Quality Processes

1. **Management System** includes all of the quality processes which are established by DPS laboratory policies and practices. The Management System is the ways and means of the laboratory to demonstrate its use of established standards and to inspire public confidence. The goal of achieving good customer relations is accomplished through the laboratory’s consistency, uniformity, integrity, traceability and validity of testing services. These quality components may focus mainly on the laboratory itself, on the individuals working within the laboratory, or both.

   a) **DPS Quality Policy Statement (LOG-01-01A)**
   
   b) **Quality Management System Responsibilities [Management System (LOG-01-02), Advisory Boards (QA-INS-AB)**
   
   c) **Approved Suppliers (LOG-01-05)**
   
   d) **Document Management (LOG-03-10, LOG-03-11)**: The QA section ensures that current versions of documents are authorized by the director and available electronically.
   
   e) **Preventive Action: (LOG-03-12B)**
   
   f) **Non-Conforming Work and Corrective Action (LOG-03-12)**
   
   g) **Root Cause Analysis (LOG-03-12, ISO 4.11)**

   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)

h) Case Record and Laboratory Case Reports (LOG-04-01, LOG-04-02) (testing)

i) Breath Alcohol Calibration Record (OSD-CAL-01) (calibration)

j) Review Process (LOG-03-03)
   i. Technical
   ii. Administrative

k) Examination Verification (LOG-03-16)

l) Management of Records (LOG-04-03, LOG-04-04)

m) Evidence Management (LOG-05-01, LOG-05-01C, LOG-05-01D, LOG-05-02, LOG-05-03)

n) Customer Feedback (LOG-03-13, LOG-03-14)

2. Individual Competence includes qualifications, training, certification of competency, employee career development, instrument authorizations, casework authorizations, continuing education, competency and proficiency testing, peer review of casework, and testimony monitoring.

   a) Training and Competency (LOG-07-01, LOG-07-02)
      i. Instrument Authorization (LOG-03-07)
      ii. Employee Career Development (LOG-07-03)
      iii. Continuing Education

   b) Proficiency Testing (LOG-03-01)

   c) Testimony Monitoring (LOG-03-02)

   d) Literature Review (LOG-07-01)

3. Laboratory Competence includes validations of instruments and methods; standards, controls and reagent performance verifications; adherence to discipline SOPs; document management, evidence control; case record and laboratory report processes; audits - internal and external; Quality Incidents and deviation processes; and processes for customer complaints and suggestions for improvement and accreditation.

   a) Accreditation, Audits and inspections (LOG-03-04, LOG-05-04)

   b) Management System Review: formal evaluation of existing processes (LOG-01-03)

   c) Validations of instruments and methods are performed before placing them into service or general practice. (LOG-03-06, LOG-03-07)

   d) Calibration and performance verification
      i. Reagents (LOG-03-08)
      ii. Instruments & Equipment (LOG-03-07)
iii. Reference Standards, Materials/Collections, Databases, and Controls (LOG-03-15)

C. 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.

1. AFQAM (Association of Forensic Quality Assurance Managers)
2. ASQ (American Society for Quality)
3. SWGDAM / TWGDAM (DNA Analysis)
4. SWGDRUG (Seized Drugs)
5. SWGMAT (Materials Analysis)
6. SWGTREAD (Tire track and shoe prints)
7. SWGFAST (Friction Ridge Analysis, Study and Technology)
8. SWGGSR (Gunshot residue)
9. SWGGUN (Firearms and Toolmarks)
10. ABFDE (American Board of Forensic Document Examiners)
11. SWGDE (Digital Evidence for Computer Forensics and for Forensic Audio)
12. SWGIT (Imaging Technology)
13. SWGDOC (Forensic Document Examination)
14. SOFT (Society of Forensic Toxicologists)
15. NIST (National Institute of Standards and Technology)
16. ASTM (American Society for Testing and Materials)
17. OSAC (Organization of Scientific Area Committees)

2.2 Required Readings

Laboratory Operations Guide (LOG), as cited
Respective Discipline SOPs
ISO/IEC 17025:2017, standards 7.10 and 8.7
ASCLD/LAB-International Supplemental Requirements
Laboratory Standards Conformance Checklist
Koehler, D. Jody, Root Cause Analysis PowerPoint presentation [PowerPoint slides].

2.3 Suggested Readings

ANAB Accreditation Requirements
3 Practice

3.1 Independent Exercises

Complete a Statement of Qualifications and Disclosure Form (either paper or electronic).

4 Assessment

4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

The trainer may opt for the trainee to complete a written exam.
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OVERVIEW OF LEGAL PROCESSES AND TESTIMONY

Duration 4 to 5 days

Purpose Become familiar with basic legal terminology and the Federal and Texas court system structure and procedures, and understand the basics of courtroom testimony.


1 Objectives

1.1 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.

1.2 Practical

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

Be familiar with the language of the judicial system.

Be familiar with Texas criminal laws to be able to look up information about punishment and offenses.

Be familiar with the various State and Federal courts through which a criminal case might progress, from origination to final appeal.

Be familiar with the possibilities for the resolution of a criminal complaint.

Be familiar with the flow of proceedings for a typical jury trial.

Understand the basics of courtroom testimony.

2 Training Outline

2.1 Lesson Plan

A. Legal definitions and terminology (refer to optional exercise LAB-GLT-05)

B. Information relevant to the analyst's specific discipline in the Discipline Specific Legal Opinions Index (GLT-TM-LAW-02A)

C. Court Systems

1. Federal Court System

   a) Federal Courts

   b) Rules of Practice

      i. Federal Rules of Criminal Procedure

      ii. Federal Rules of Civil Procedure

2. Texas Court System

   a) Texas Courts Structure

   b) Texas Justice System
c) **Texas Criminal Justice Process**

d) **Rules of Practice**

i. **Texas Code of Criminal Procedure**

Search Warrants - Chapter 18

Duties and Powers of the Grand Jury - Chapter 20

Subpoenas and Attachment - Chapter 24

The Trial before the Jury - Chapter 36

   Invocation of Rule - Article 36.03

   Not Hear Testimony - Article 36.05

   Instructed by the Court - Article 36.06

Evidence in Criminal Actions - Chapter 38

Texas Forensic Science Commission - Article 38.01

Forensic Analysis of Evidence, Admissibility - Article 38.35

Certificate of Analysis - Article 38.41

Chain of Custody Affidavit - Article 38.42

Preservation of Evidence Containing Biological Material - Article 38.43

Depositions and Discovery - Chapter 39

Confidentiality of Identifying Information of Sex Offense Victims - Chapter 57

D. **DPS Policies concerning Testimony, Disclosure and Release of Information**

1. **DPS General Manual, Chapters 5 and 21**

   a) **DPS Honor Code – 05.108**

   b) **Documentation, Preservation and Disclosure of Evidence – 05.20**

   c) **Testimony on Behalf of a Criminal Defendant – 05.25**

   d) **Court Appearances and Testimony - 05.54**

   e) **Confidential Information - 05.75**

   f) **Public Speeches and Articles - 05.76**

   g) **Public Statements - 05.78**

   h) **Social Networking Policy - 05.79**

   i) **DPS Ten General Orders – 06.10.01**

   j) **Standards of Conduct – 06.20.02**

   k) **Determining Appropriate Level of Discipline – 07.43.07**

   l) **Release of Information in Criminal Investigations – 21.02**

   m) **Public Information Requests - 21.03**
2. Laboratory Operations Guide
   a) Crime Lab Overview (LOG-01-01)
   b) Management System (LOG-01-02)
   c) Court Testimony Monitoring (LOG-03-02)
   d) Release of Records (LOG-04-04)
   e) Biographical Datasheet (LOG-07-05)

E. Testimony Training
1. Types of subpoenas
2. Understanding roles and responsibilities
   a) Witness
      i. Arrival at court
      ii. Demeanor, body language, credibility, and professionalism
      iii. Qualifying as an expert witness
      iv. Presentation of scientific principles and results in an understandable manner
   b) Judge
   c) Prosecutor
   d) Defense

F. Courtroom Presentation
1. Pretrial preparation
2. Proper dress and appearance
   a) Courtroom attire (LOG-01-06)
   b) Employee appearance (GM 05.65)
3. Courtroom etiquette

G. Recognize and Anticipate Strategies
1. Defense trial strategies
2. Witness strategies
3. Types of questions
4. Impeachment
5. Closing
6. Outside defense strategies

2.2 Required Readings

Texas Department of Public Safety Crime Laboratory Service Courtroom Testimony PowerPoint presentation [PowerPoint slides].

Texas Department of Public Safety Crime Laboratory, Laboratory Operations Guide, as cited.

texas Department of Public Safety General Manual, as cited

Texas Code of Criminal Procedure, as cited

2.3 Suggested Readings/Materials


3 Practice

3.1 Observed Performance

Observe courtroom testimony of experienced DPS experts on cases involving trainee’s specific discipline whenever possible. Keep a record of witnesses and cases observed. If possible, observe one trial from start to finish, including jury selection and closing arguments. The Court Observation Log (LAB-QA-26) can be used for this purpose.

3.2 Independent Exercises

Complete or update a Statement of Qualifications and Disclosure Form (paper or electronic).

Optional: Complete the Legal Terms Exercise (LAB-GLT-TM-05).

4 Assessment

4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

The trainer may opt for the trainee to complete a written exam.
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RULES OF EVIDENCE AND GENERAL LEGAL OPINIONS

Duration 2 to 4 days

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


1 Objectives

1.1 Theoretical

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

1.2 Practical

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

Be familiar with the significance of the State and Federal Rules of Evidence to evidence admissibility.

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.

2 Training Outline

2.1 Lesson Plan

A. Federal Rules of Evidence

1. 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.

2. 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.
3. 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.

B. Texas Rules of Evidence

1. Relevancy and Its Limits - Article IV
2. Witnesses - Article VI
3. Opinions and Expert Testimony - Article VII
4. Hearsay - Article VIII
5. Contents of Writing, Recordings and Photographs - Article X

C. Sequestration of Expert Witness

1. Sequestration of witnesses serves two related policies:
   a) To prevent witnesses from tailoring testimony in light of the testimony of other witnesses,
   b) To permit discovery of false testimony and other credibility problems.

   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.

D. Rulings significant to admissibility of evidence and of expert witness.

1. Federal Admissibility
   a) 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.
b) Expert Evidence Trilogy

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.

Kumho Tire Co. v. Carmichael (1999)

2. Texas Admissibility

a) Texas-Judicial Gate Keeping

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

c) Texas variations on Daubert


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.

United Blood Services v. Longoria (1997)
Maritime Overseas Corp v. Ellis (1998)


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.

3. Federal “Fruit of the Poisonous Tree” Doctrine
   a) 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.
   b) 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.

4. Federal Duty to Disclose
   a) 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.
      i. 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.
   b) 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.
   c) 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.

5. State Duty to Disclose
   a) 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.

6. Texas Duty to Preserve Evidence, Records
   a) Juan Manuel Fonseca v. Texas (2004) [spoliation]
   b) Jose Pena v. Texas (2007)

7. Texas Admissibility of Testimony by Other than Examiner
   a) Timothy Brian Cole v. Texas (1992)
   b) Fidel Y. Aguilar v. Texas (1994)
   c) Maria Martinez v. Texas (2000)
   d) Melendez-Diaz (2008)
   e) People v. Holmes (2012)
   f) Bullcoming v. New Mexico (2011)
   g) Paredes v. Texas (2015)

2.2 Required Readings/Materials

All cited cases


Texas Code of Criminal Procedure Chapter 39. Depositions and Discovery.

[TDCAA] Texas District and County Attorneys Association. 2014. Prosecutor Ethics and Brady Evidence [video]

2.3 Required Readings/Materials

3 Discipline Specific Legal Opinions Appendix (GLT-TM-LAW-02A)Practice

3.1 Independent Exercises

Optional: Complete the Legal Terms Exercise (LAB-GLT-05).
4 Assessment

4.1 Competency and Qualifying Examination

The trainee must complete all assignments. Successful completion of this module is determined by the trainer.

The trainer may opt for the trainee to complete a written exam.
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DISCIPLINE SPECIFIC LEGAL OPINIONS APPENDIX

1 Training Outline

1.1 Lesson Plan

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

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

2 Significant Discipline Court Opinions

2.1 Controlled Substances

A. Usable quantity


B. Codeine penalty group designation


C. Adulterants and Diluents

1. Craig William Reeves v. Texas (1990) [superseded by several]

D. Random sampling


2.2 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]

2.3 Trace Evidence
1. David Leonard Wood v. TDCJ (Summarizes Wood v. TX 1995) [fiber case]
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]…."

2.4 Medical Expert

2.5 Latent Prints
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/photos of palms]
5. State (Oregon) v. Smith 128 Or. 515, 273 P. 323 (1929)
7. People v. Les 267 Mich. 648 255 NW 407 (1934) [Admissibility of footprint friction ridge skin to make identifications]
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]
13. United States v. Llera-Plaza

2.6 Blood Alcohol and Breath Alcohol Analysis

A. Videotape of traffic stop

B. DPS v. Carol Ann Cortinas (1998) [affidavit of breath test results admissible at ALR hearing]

C. Retrograde extrapolation
   1. Teresa Martin v. DPS (1998)
   3. Allan Spock Hartman v. Texas (1999) [overruled by Bagheri]


E. Bullcoming v. New Mexico [lab report is testimonial but does not violate confrontation clause when results testified to by another qualified analyst]

F. Selection of DWI Court Decisions - Ansolabehere, J (2011)

2.7 Firearms and Toolmarks


D. California v. Earl Eugene Rose (2009)

E. Florida v. Shawn Emmanuel Richardson (2013)

F. Other resources are available under the AFTE Admissibility Resource Kit (ARK) at www.afte.org

2.8 References

Cited cases
Revision History

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MEASUREMENT UNCERTAINTY

**Purpose**

Every measurement reported by the Crime Laboratory Service has an inherent uncertainty about that reported value. This module has been created to inform examiners of the steps taken to determine reported measurement uncertainties and to prepare them for presentation of the concept in court.

**Prerequisite** None

1 **Objectives**

1.1 **Theoretical**

Every measurement is subject to some uncertainty. According to ISO standards, a measurement result is only complete if it is accompanied by a statement of the uncertainty in the measurement. Measurement uncertainties can come from the measuring instrument, 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.

1.2 **Practical**

This training module has been created to inform and instruct the trainee on the concepts usually encountered when discussing measurement uncertainty and the reporting of it. The established rules for calculating a measurement uncertainty will be presented as a way of preparing the trainee for offering an explanation when one is requested. The examiner will be supplied a value which must be reported for the particular measurand. However, it will not be a requirement of an examiner to calculate the needed measurement uncertainty.

2 **Training Outline**

2.1 **Commonly used definitions in the measurement uncertainty realm**

**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)

**Bias (of measuring instrument)** – Systematic error of the indication of a measuring instrument.

**Calibration** – Operation that establishes a relationship between the value/response of a measuring instrument and the accepted values of the standards.

**Combined Standard Uncertainty** – The result of the combination of standard uncertainty components.

**Confidence level** – Number (e.g. 95%) expressing the degree of confidence in a result.

**Correlation** – Independence or relationship between data or measured quantities.

**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.
Error – Offset or deviation between the result of a single measurement and the correct value; does not mean that a mistake was made.

Expanded uncertainty – Standard uncertainty (or combined standard uncertainty) multiplied by a coverage factor \( k \) to give a particular level of confidence.

Expression of uncertainty – Measurand ± uncertainty (e.g.-a confidence level 95% with a coverage factor, \( k =2 \)).

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.

Mean – Average of a set of measurements.

Measurand – Particular quantity subject to measurement.

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.

Precision – Closeness of agreement between test results under stipulated conditions

Range – Difference between the highest and lowest of a set of values.

Rectangular distribution – Distribution of values have equal likelihood of falling anywhere within a range.

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.

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.

Resolution – The smallest increment of change in the measured parameter which can be measured with the instrument.

Standard deviation – A measure of the spread of a set of results, describing how values typically differ from the average of the set.

Standard uncertainty – Uncertainty of a measurement expressed as a margin equivalent to plus and minus (±) one standard deviation.

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.

Traceability – The ability to relate the accuracy of measurement back to the appropriate standard through an unbroken chain of comparisons all having stated uncertainties.

Triangular distribution – Distribution of values near the nominal value are more likely than those near the extremes

True value – The value that would be obtained by a theoretical perfect measurement.

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.

Type B evaluation of uncertainty – Evaluation of uncertainty by non-statistical methods; by any means other than for Type A.
Uncertainty budget – Summary of the combined uncertainty calculations including a listing of all factors that contribute to the overall uncertainty measurement for a process.

Uncertainty of measurement – An estimate of the range of values within which the true value is likely to be found.

2.2 Other measurement uncertainty concepts

A. A measurement:
   1. Tells us about a property of something
   2. Gives a number to that property
   3. Always made using an instrument of some type
   4. Expressed in two parts: a number and a unit (e.g. 0.2 mg)

B. Uncertainty of measurement:
   1. A range of values within which any other measured value of the same item would be expected to be found
   2. Usually expressed in terms of a 95% confidence limit, but may be 99.7%
   3. Define and classify components of measurement uncertainty
      a) Type A Uncertainty – statistical (usually from repeated measurements)
      b) Type B Uncertainty – estimates from any other source (e.g. past experience, calibration certificates, manufacturer’s specifications, calculations, published information)
      c) Typically both types are necessary when determining combined measurement uncertainty.

C. Error vs. Uncertainty
   1. Uncertainty is **not** error
   2. Error is the difference between the measured value and the true value
   3. 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)
   1. Mean or average ($\bar{x}$) - sum of all measurement values divided by the number of measurements.
   2. How many measurements should be taken to determine an average?
      a) The more results you use, the closer you get to the ideal estimate of the mean
      b) Performing more measurements takes extra effort, and at some point will yield diminishing returns with respect to changing the average
      c) A general rule of thumb is 4-10 measurements is sufficient
3. Standard deviation – Spread of the measurements ($\sigma$) 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

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

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

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

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

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

   a) *With triangular distributions, the denominator value is determined based on the assumed shape of the triangle.

   i. *6 is used when the triangle shape is isosceles (symmetric triangular distribution).

   ii. *18 is used when the triangle shape is a right triangle with the right angle above the highest point.

6. 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)

7. 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)

8. 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) In general, each of these would be considered an individual factor which would make a contribution to the overall uncertainty in the reported measurement.

- Measuring instrument
- Item being measured
- Measurement process
- Calibration of instruments
• Operator skills (e.g. parallax errors)
• Sampling issues
• Environmental conditions

1. Repeatability/Reproducibility
   a) Repeatability
      i. Estimation of best capability
      ii. Control all variables; eliminate as many as possible
      iii. Short term
   b) Reproducibility
      i. Estimation of day-to-day capability
      ii. Include all variables, but stay within specified limits
      iii. Long term

2. Divisors for converting expanded standard deviations into standard deviation:
   a) 1 - If the distribution is normal and the standard deviation is already expressed as 1σ
   b) 2 - If the distribution is normal and the standard deviation is expressed as 2σ (a 95% confidence limit)
   c) 3 - If the distribution is normal and the standard deviation is expressed as 3σ (a 99.7% confidence limit)
   d) \(\sqrt{3}\) - If the distribution is rectangular
   e) * - If the distribution is triangular, the divisor varies based on the shape of the distribution

3. What is not a measurement uncertainty
   a) Mistakes made by examiners are not measurement uncertainties and should not be counted as making a contribution to the combined uncertainty.
   b) Tolerances are not measurement uncertainties. They are acceptance limits chosen for a process or a product.
   c) 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.
   d) Error is not uncertainty. (See previous descriptions of these two terms and the differentiation)

2.3 The determination of the uncertainty of measurements reported by the Texas DPS Crime Laboratory Service followed a simplified GUM approach

The eight-step GUM approach:
Step 1: Define what is being measured
Step 2: Identify the sources of uncertainty
Step 3: Reconcile uncertainty sources
Step 4: Quantify uncertainty sources
Step 5: Convert to standard uncertainties
Step 6: Combine uncertainties
Step 7: Express as expanded uncertainty
Step 8: Report results with uncertainty

Step 1 Define What Is Being Measured
The accrediting body has defined for its forensic community, “measurements that matter”: weights of drugs, quantity of drugs, quantity of blood alcohol in a biological specimen, quantity of drugs in a biological specimen, and length(s) of firearms.

Step 2 Identify the Sources of Uncertainty
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.

From a practical standpoint, potential sources of uncertainty could be (from the realm of drug quantitation): flask calibration, ambient room temperature, repeatability of making measurements in a class A flask (or other class A volumetric glassware), calibration and linearity of the balance used (from certificate), repeatability of check weighings, purity of the calibrator (from certificate), homogeneity of the sample tested.

Step 3 Reconcile Uncertainty Source(s)
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.

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.

1. 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.

2. 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.

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.

Step 6  Combine Uncertainties
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.

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

$$U_{corr} = (U_1 + U_2 + U_3 + U_4 + \ldots)$$

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

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

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

Step 7  Express as Expanded Uncertainty
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.

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 ($\pm$ 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 ($\pm$ 3 standard deviations).

**Step 8 Report Result with Uncertainty**

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.

For example: a blood alcohol result: 0.081 mg/100 mL ± 0.002 mg/100mL (99.7% confidence)

**2.4 Required Readings**

A. General


B. ASCLD/LAB measurement traceability and measurement uncertainty policy documents:

ASCLD/LAB Policy on Measurement Traceability

ASCLD/LAB Policy on Measurement Uncertainty

C. ASCLD/LAB measurement traceability and measurement uncertainty guidance documents:

The following special groups of guidance documents are provided to assist in better understanding and applying measurement traceability and measurement uncertainty concepts with respect to ASCLD/LAB opinions.

ASCLD/LAB Guidance on Measurement Traceability

ASCLD/LAB Guidance on Measurement Traceability – Measurement Assurance

ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – Overview
2.5 Suggested Readings/Courses

A. Current List of Potential Testimony Questions Regarding Uncertainty

International Standard ISO/IEC 17025:2005, General Requirements for the competence of testing and calibration laboratories, International Organization for Standardization. Standards 5.1.2 (general), 5.4 Test and calibration methods and method validation, 5.4.6 Estimation of uncertainty of measurement, 5.10.3.1 Test reports


LeBeau, Marc, Introduction to Uncertainty in Forensic Chemistry and Toxicology, course presented by RTI International, February 9, 2009. [RTI Forensic Science Education]


NIST Technical Note 1297, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results.

SWGDRUG, Quality Assurance/Uncertainty, Supplemental Document SD-3 for Part IV C.

SWGDRUG, Quality Assurance/Uncertainty, Supplemental Document SD-4

Indiana University Robert F. Borkenstein Course on Alcohol and Highway Safety: Testing, Research and Litigation. [Breath/Blood Alcohol]

ANAB GD 3003, Guidance on Uncertainty and Traceability for Forensic Agencies

3 Practice

3.1 Independent Exercises

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

4 Assessment

The competency for the unit will be for the trainee to explain, in layman terms, measurement uncertainty for their discipline.

Satisfactory completion of the Measurement Uncertainty Unit is mandatory for testifying laboratory personnel in the following disciplines: Blood Alcohol, Breath Alcohol Testing,
Controlled Substances, Firearms/Toolmarks, and Toxicology. All assignments within the Measurement Uncertainty Unit must be completed before a Certificate of Completion (LAB-QA-31) is achieved.

The Measurement Uncertainty Unit must be completed prior to independent work authorization for the mandatory disciplines listed above.
## Revision History

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ADVANCED QUALITY ASSURANCE

Duration 2 weeks

Purpose Familiarize trainee with advanced topics in quality assurance

Prerequisite GLT-TM-FUN-01 New Employee Orientation; GLT-TM-FUN-06 Intro to Quality Assurance

1 Objectives

1.1 Theory

Formal methods of quality assurance 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.

1.2 Practical

Following the completion of training the trainee will:

- Understand document control and management.
- Understand record archiving, legal requests for documents and records, and record retention.
- Define and discuss policy deviation and write an effective deviation request.
- Understand requirements for purchasing services and supplies.
- 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.
- Articulate the process steps and the documentation for a trainee to become an examiner.
- Be familiar with the roles and responsibilities of advisory board members.
- Be familiar with the relevant accreditation and quality assurance standards.
- Understand the audit process and the roles and responsibilities of auditors.
- Understand the process for instrument and method validations.

2 Training Outline

2.1 Lesson Plan

A. Implementation of Concepts in the Laboratory

1. Document Control and Document Management (LOG-03-10, ISO 4.3)
   a) Policies and procedures
   b) Guidelines for Writing SOPs (QA-INS-DC-01)
   c) Guidelines for Writing Training Manuals (QA-INS-DC-02)
d) Authorization of external documents

e) Control of instrument controlling software (ISO 5.4.7.2)

f) Control of other laboratory software such as LIMS, workbooks, macros (if they impact results)

g) Use of forms or electronic equivalents Document Authorization (LAB-QA-01), Document Awareness Form (LAB-QA-16), External Document List (LAB-QA-20), Laboratory Software List (LAB-QA-24), Software Authorization (LAB-QA-24A), and Annual Controlled Document Review (LAB-QA-30)

2. Deviation Requests

a) Process-related, not personnel-related

b) Declaration of a planned policy deviation from documented procedures (LOG-03-11)

c) Use of Deviation Request (LAB-QA-02) and Deviation Request Supplement (LAB-QA-02A) forms

3. Validation of instruments and methods

a) Validation (LOG-03-06, ISO 5.4)

b) Instruments and Equipment (LOG-03-07, ISO 5.5)

c) Use of forms Method Validation (LAB-QA-14) and Instrument Validation (LAB-QA-15)

4. Customer Surveys (LOG-03-14)

a) Suggestions and/or Complaints (LOG-03-13)

b) Use of form Customer Survey (LAB-QA-23, LAB-QA-33)

c) Use of form Complaint Log (LAB-QA-19)

5. Preventive Actions (LOG-03-12B)

a) Use of form Preventive Action Report (LAB-QA-05D)

6. Non-conforming work (LOG-03-12)

a) Use of form Quality Incident Report (LAB-QA-04)

b) Use of form Significant Disclosure Report (LAB-QA-05C)

7. Root Cause Analysis (LOG-03-12, ISO 4.11)

a) Directive Recommendation: Root Cause Analysis (RCA) in Forensic Science form the National Commission on Forensic Science

b) Risk, Reward, and Redemption: Root Cause Analysis in Forensic Organizations

c) Root Cause Analysis (presentation from the Texas Forensic Science Commission)

d) Use of form Action Plan/Supplement (LAB-QA-05), Action Item Summary (LAB-QA-05A), and Action Monitoring Report (LAB-QA-05B)
8. Records Management
   a) Case Record (LOG-04-01) and Control of Lab Records (LOG-04-03)
   b) Archived/electronic records
      i. Admissibility of Electronic Record (Code of Criminal Procedure Chapter 38.44)
      ii. Archived records location
      iii. Guidelines for Naming and Formatting Documents (QA-INS-DC-03)
      iv. Practices for Archival, Posting and Notification of Controlled Documents (QA-INS-DC-04)
      v. Instructions for Electronic Archival Process of Designated Records (QA-INS-RR)
   c) Release of records: open records, court orders, subpoenas, discovery and expungement (LOG 04-04, ISO 4.13)
      i. Assessment of records for release
      ii. Conditional Release of Records and Information (LOG-04-04)
      iii. Public Information Act (Government Code Chapter 552)
      iv. Depositions and Discovery (Code of Criminal Procedure Chapter 39)
      v. Redaction of information from records
      vi. Records Retention, Quarterly Audits and Disposition Logs

9. Training and Competency
   a) Training certification of competency and approval for independent casework, new and continued
      i. Employee Training Program (LOG-07-01)
      ii. Work Authorization (LOG-07-02, ISO 5.2)
   b) Employee Career Development (LOG-07-03)
   c) Continuing Education
   d) Use of forms
      i. Certification of Competency (LAB-QA-03)
      ii. Authorization for Independent Casework (LAB-QA-13, LAB-QA-13A)
      iii. Training Evaluation Form (LAB-QA-21)

10. Proficiency Testing (ISO 5.9)
    a) Proficiency Testing (LOG-03-01)
    b) Use of Proficiency Review Form (LAB-QA-09) and Evidence Reexamination Assessment Form (LAB-QA-17)
11. Testimony Monitoring
   a) Testimony Monitoring (LOG-03-02, ISO 5.9.6)
   b) Use of Testimony Evaluation Form (LAB-QA-11) and External Testimony Evaluation Form (LAB-QA-12)

12. Control of Purchased Products and Reagents
   a) Approved suppliers list – Purchasing Supplies and Services (LOG-01-05, ISO 4.6)
   b) Use of Approved Supplier List Modification (LAB-QA-25) form

13. Laboratory Audits (LOG-03-04)
   a) Management System Review (LOG-01-03)
   b) Evidence Vault Inspection (LOG-05-04)
   c) Safety (SAF-06-01)
   d) Internal Audit Instructions (QA-INS-IA)
   e) Use of forms: Laboratory Management System Survey (LAB-QA-32), Quarterly Laboratory Management System Survey (LAB-QA-32A), Evidence Inspection Form (LAB-QA-06), Safety Inspection Form (LAB-SAF-01), Case File Audit Trail Worksheet (LAB-QA-22), Internal Audit Milestones (LAB-QA-34)

B. Advanced Roles in the Management System (LOG-01-01, LOG-01-02)
   1. Advisory Boards/Committees (QA-INS-AB) (See Advisory Board Training)
   2. Auditors
      a) Forensic ISO/IEC 17025 Assessor Training (Testing or Calibration)
      b) Quality Assurance Standards (QAS) Auditor Training
      c) Internal Audit Auditor Training
      d) ANAB Technical Assessor Training
   3. Accreditation and Certification/Licensing (Code of Criminal Procedure Chapter 38.01 4-a and 4-d)

2.2 Required Readings
   1. Laboratory Operations Guide (LOG), as cited
   2. Respective Discipline SOPs
   5. ASCLD/LAB International Supplemental Requirements
   6. ANSI-ASQ National Accreditation Board (ANAB) website
   7. Code of Criminal Procedure Chapter 38.01 - Texas Forensic Science Commission
8. Code of Criminal Procedure Chapter 38.35 - Forensic Analysis of Evidence & Admissibility
9. Code of Criminal Procedure Chapter 38.44 - Admissibility of electronic record
10. Code of Criminal Procedure Chapter 39 - Depositions & Discovery
13. Government Code 552 (Public Information Act)
14. DPS Records Retention Policy/Schedule

2.3 Suggested Readings/Materials
1. ANSI-ASQ National Accreditation Board (ANAB) Requirements
2. Quality Assurance Standards for Forensic DNA Testing Laboratories
3. Quality Assurance Standards for Forensic DNA Databasing Laboratories

3 Practice
3.1 Observed Performance
None

3.2 Supervised Performance

Prepare document authorization form and document(s) for authorization
Prepare a modification of the external documents list (or electronic equivalent) for authorization
Prepare a software authorization form and supporting documentation for approval
Prepare a deviation request, including the form and supporting documentation
Prepare a validation form for authorization
Review 5 quality incident/action plan records from at least 5 laboratory locations
Initiate the quality incident process for a nonconforming event
Evaluate root cause as part of a Quality Incident or Action Plan and
Prepare a case record for open records release (optional)
Prepare a disposition log entry for record destruction (optional)
Review training records and prepare forms for examiner approval
Review the equipment authorization list for approval
Archive a testimony evaluation upon approval
Prepare a request for approval of vendor(s)
Run QA Reports in LIMS
Perform an evidence reconciliation of a vault or location

Complete the online Quality Assurance Standards (QAS) Auditor Training (https://fbiva.fbiacademy.edu) (as available for personnel involved with DNA) (Optional)

Complete the ISO Training/ANAB Assessor Training (as available)

4 Assessment of Training

The trainee must complete all required assignments. Successful completion of this module is determined by the trainer.

The trainee and trainer will complete the Advanced Quality Assurance Unit checklist. At the conclusion of the module, a Certificate of Completion will be awarded.
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<td>Administrative Revision – Section 2.1</td>
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</table>
**Fundamentals Unit Checklist**

**GLT-TM-01 Overview**
- Awareness of the Table of Contents (GLT-TM-MDL) and the Matrix (GLT-TM-01A)
- Awareness of the trainer/trainee responsibilities and records for the training notebook

**GLT-TM-FUN-01 New Employee Orientation**

<table>
<thead>
<tr>
<th>Required Readings/Materials</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX DPS General Manual, as cited</td>
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<tr>
<td>TX DPS Laboratory Operations Guide (LOG), as cited</td>
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<tr>
<td>TX DPS Physical Evidence Handbook, as cited</td>
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<tr>
<td>Employment Discrimination Workbook For New State Employees (EEO-5 or electronic version)</td>
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<tr>
<td>Employee Handbook (HR-166)</td>
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</table>

**Independent Exercises**
- Complete the New Employee Orientation Packet (HR-26)
- Discuss mission, organization, and additional expectations for the job
- Review the performance plan with supervisor
- Tour assigned duty station facility including introductions, safety devices, SDS, hazards, security, and evacuation route
- Review use of phone system features
- If applicable, review vehicle use procedure and policy
- If applicable, complete application for travel credit cards
- Complete EEO Training New Hire and Compliance (online training)
- Complete Documentation, Preservation, Disclosure of Evidence (online training)
- Complete Records Management (online training)
- Complete SANS Securing the Human Security Awareness (online training)

**Assessment**
- Optional written exam

**GLT-TM-FUN-02 General Safety**

<table>
<thead>
<tr>
<th>Required Readings/Materials</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
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<tbody>
<tr>
<td>OSHA 3404-11R</td>
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<tr>
<td>TX DPS Safety Manual, entirety</td>
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<tr>
<td>TX DPS General Manual, as cited</td>
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<tr>
<td>NIOSH Pocket Guide to Chemical Hazards</td>
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<tr>
<td>View safety videos (titles listed below)</td>
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**Independent Exercises**
- LAB-GLT-02 Workplace Safety Exercise
### GLT-TM-FUN-02 General Safety

<table>
<thead>
<tr>
<th>Item</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
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</thead>
<tbody>
<tr>
<td>Begin Hepatitis B vaccination series OR complete LAB-SAF-02 Hepatitis Vaccination Declination form. Documentation is not submitted with notebook.</td>
<td>Date discussed</td>
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<tr>
<td>Complete Narcan Administration (online training)</td>
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<tr>
<td>Complete Bloodborne Pathogens (online training)</td>
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<tr>
<td>Optional LAB-GLT-03 General Safety Exercise</td>
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**Assessment**

- Optional written exam(s)

### GLT-TM-FUN-04 Forensic Science and Evidence Management

**Required Readings/Materials**

- The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers (NISTIR 7928)
- Texas Forensic Science Commission Evidence Handling Procedures presentation
- TX DPS Laboratory Operations Guide LOG, as cited
- ASCLD/LAB-International Supplemental Requirements
- ISO 17025:2005 or current version, Standard 5.8
- Saferstein: Criminalistics Chapter 1 and 3
- TX DPS Physical Evidence Handbook, as cited

**Suggested Readings**

- LIMS Manual

**Observed Performance (optional for CODIS and Breath Alcohol)**

- Observe evidence coordination personnel receiving/returning evidence to customers
- Observe analysts opening, examining, marking, sealing and storing evidence in different sections of the laboratory
- Discuss all the types of evidence and the proper storage conditions and security level for each

**Supervised Performance (optional for CODIS and Breath Alcohol)**

- Demonstrate proper sealing of an envelope, paper bag, and cardboard box
- Search the case record in LIMS for custody, location and other information

**Assessment**

- Optional written exam

### GLT-TM-FUN-05 Ethics and Professionalism

**Required Readings/Materials**

- ANAB Guiding Principles of Professional Responsibility for Forensic Service Providers and Forensic Personnel
- Texas Forensic Science Commission Code of Professional
## GLT-TM-FUN-05 Ethics and Professionalism

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
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<tbody>
<tr>
<td>Ethics in Forensic Science (Chapters 3 and 13)</td>
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<tr>
<td>Ex parte Coty decision and the fallout from an unethical lab tech article</td>
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<tr>
<td>Laboratory Operations Guide, as cited</td>
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<tr>
<td>Texas Ethics Commission Guides and Training links</td>
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<tr>
<td>TX DPS General Manual, as cited</td>
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<tr>
<td>Strengthening Forensic Science in the United States: A Path Forward</td>
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<tr>
<td>Start Right……Stay Right (Every Employee’s Straight-Talk Guide to Job Success), Steve Ventura</td>
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<tr>
<td>MFRC Ethics in Forensic Sciences (PowerPoint presentation or DVD), Dan Grunnell</td>
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<tr>
<td>Law review article on the role of forensic science in wrongful convictions</td>
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</table>

### Independent Exercises

- Texas Ethics Commission (online training)
- Optional supplemental assignment(s) by the trainer

### Assessment

- Optional written exam

## GLT-TM-FUN-06 Introduction to Quality Assurance

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<thead>
<tr>
<th>Required Readings/Materials</th>
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<tr>
<td>TX DPS Laboratory Operations Guide and forms, as cited</td>
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<td>TX DPS Respective discipline SOP</td>
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<tr>
<td>ASCLD/LAB-International Supplemental Requirements</td>
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<tr>
<td>ISO 17025:2005 and 2017, as cited</td>
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<tr>
<td>Laboratory Standards Conformance Checklist</td>
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<tr>
<td>Root Cause Analysis presentation from the Forensic Science Commission</td>
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<tr>
<td>NIST National Commission on Forensic Science Directive Recommendation: RCA in Forensic Science</td>
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</table>

### Suggested Readings

- ANAB Accreditation Requirements (optional)

### Independent Exercises

- Complete Statement of Qualifications (SOQ) and Disclosure Form (DF)

### Assessment

- Optional written exam
Trainee Name _____  Date Training Began _____  Trainer Initials/Date _______

Obtain or create a simple map of your work area. A copy of the posted emergency exit map is ideal. Mark locations and clearly identify items on the diagram as to the locations/type of safety devices (fire extinguishers, safety showers, eyewash, alarm pull stations, opioid exposure kits, duress buttons etc.), the location where SDS are kept, the site of known potential hazards, such as chemical storage areas and laser use areas, and the emergency exits.

Identify laboratory safety advisor and any personnel trained in CPR and First Aid.
Welcome to your duty station in the Texas DPS Crime Laboratory Service! Now that you are studying Safety topics, take a good look around your own workplace. Create a list of all the materials and reagents you are either expected to handle or will be working near, such as in the situation of a shared hood or common work area. Following the examples given, research SDS, chemical labels, local policy, and other resources to determine the associated hazards, and how to properly handle and dispose of the material and associated waste created during use. **The example answers may not be the most appropriate for your laboratory facility.**

<table>
<thead>
<tr>
<th>Material or Reagent</th>
<th>Associated Hazard(s)</th>
<th>Handling Instructions</th>
<th>Waste Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example #1 Blood</td>
<td>Biohazard (HIV, HBV)</td>
<td>Use gloves, lab coat, hood, disposable brown paper</td>
<td>Autoclave disposable PPE and brown paper Wash cloth lab coat with bleach in lab washing machine</td>
</tr>
<tr>
<td>Example #2 Methanol</td>
<td>Flammable, poison</td>
<td>Keep away from open flame; prevent inhalation and skin contact</td>
<td>Pour into labeled waste bottle under hood</td>
</tr>
<tr>
<td>Example #3 Syringe with a cap</td>
<td>Biohazard (HIV, HBV)  Puncture hazard</td>
<td>Recap using one-handed method</td>
<td>If evidence, return to a syringe transport tube prior to repackaging</td>
</tr>
</tbody>
</table>
## GLT-TM-LAW-01 Overview of Legal Process and Testimony

<table>
<thead>
<tr>
<th>Required Readings/Materials</th>
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<tbody>
<tr>
<td>- Expectations of Forensic Analysts presentation</td>
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<tr>
<td>- Forensic testimony: science, law and expert evidence</td>
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<tr>
<td>- DPS Courtroom Testimony (available on eTrain)</td>
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<tr>
<td>- TX DPS General Manual, as cited</td>
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<tr>
<td>- TX DPS Laboratory Operations Guide LOG, as cited</td>
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<tr>
<td>- Texas Code of Criminal Procedure, as cited</td>
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</table>

### Suggested Readings/Materials


### Observed Performance

- Observe courtroom testimonies

### Independent Exercises

- Complete or update SOQ and DF
- Optional LAB-GLT-TM-05 Legal Terms Exercise

### Assessment

- Optional written exam

## GLT-TM-LAW-02 Rules of Evidence and General Legal Opinions

<table>
<thead>
<tr>
<th>Required Readings/Materials</th>
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<tbody>
<tr>
<td>- All cited cases</td>
<td></td>
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<tr>
<td>- Federal Rules of Evidence, as cited</td>
<td></td>
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<tr>
<td>- Texas Rules of Evidence, as cited</td>
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<td></td>
<td>Trainee Initials/Date</td>
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<tr>
<td>National Commission on Forensic Science Pretrial Discovery in Forensic Science</td>
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<tr>
<td>Texas Code of Criminal Procedure Chapter 39</td>
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<tr>
<td>Texas District and County Attorneys Association. 2014. Prosecutor Ethics and Brady Evidence [video]</td>
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<tr>
<td>Optional GLT-TM-LAW-02A Discipline Specific Legal Opinions Appendix</td>
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</tbody>
</table>

**Independent Exercises**

- Optional LAB-GLT-TM-05 Legal Terms Exercise
- TDCAA video on Prosecutor Ethics and Brady Evidence

**Assessment**

- Optional -written exam
Most of the following terms are defined in the glossaries of *The Expert Witness Handbook*, by Dan Poynter, of *Succeeding as an Expert Witness*, by Harold Feder, and in a *Glossary of Legal Terms* compiled by Kaye Davis from Law Dictionary (Hill) and Constitutional Rights Foundation Glossary. The trainee may also consult any legal dictionary for the definitions or other electronic resources such as Legal Dictionary and Cornell University’s Wex. It is recommended that the trainee compare definitions from multiple sources for greater understanding and seek clarification for any apparent discrepancies. This list is not comprehensive, and the trainee may wish to note additional terms.

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### GLT-TM-UNC Measurement Uncertainty Checklist

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<tr>
<th>Required Readings</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
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<tbody>
<tr>
<td>ASCLD/LAB Policy on Measurement Traceability</td>
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<td>ASCLD/LAB Policy on Measurement Uncertainty</td>
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<tr>
<td>ASCLD/LAB Guidance on Measurement Traceability</td>
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<tr>
<td>ASCLD/LAB Guidance on Measurement Traceability – Measurement Assurance</td>
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<tr>
<td>ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – Overview</td>
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<tr>
<td>ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – ANNEX A / Details on the NIST 8-Step Process</td>
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<tr>
<td>For Controlled Substances only: ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – ANNEX B / Drug Chemistry</td>
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<tr>
<td>For Firearms and Toolmarks only: ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – ANNEX C / Firearms &amp; Toolmarks</td>
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<tr>
<td>For Toxicology and Blood Alcohol only: ASCLD/LAB Guidance on the Estimation of Measurement Uncertainty – ANNEX D Toxicology Testing</td>
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<tr>
<td>Validation documents for the related discipline which are used to establish the expanded measurement uncertainty</td>
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</table>

### Suggested Readings/Courses

- International Standard ISO/IEC 17025:2005, General Requirements for the competence of testing and calibration laboratories, International Organization for Standardization. *Standards 5.1.2 (general), 5.4 Test and calibration methods and method validation, 5.4.6 Estimation of uncertainty of measurement, 5.10.3.1 Test reports*
- The Indiana University Robert F. Borkenstein Course on Alcohol and Highway Safety: Testing, Research and Litigation [Breath/Blood Alcohol]
- SWGDRUG, *Quality Assurance/Uncertainty, Supplemental Document SD-3 for Part IV C. Controlled Substances*
- SWGDRUG, *Quality Assurance/Uncertainty, Supplemental Document SD-4 [Controlled Substances]*
- NIST Technical Note 1297, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*
- ANAB GD 3003, *Guidance on Uncertainty and Traceability for Forensic Agencies*

### Independent Exercises

- Measurement uncertainty review of terms and concepts
- Optional: Additional exercise questions
<table>
<thead>
<tr>
<th>Assessment</th>
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<tbody>
<tr>
<td>☐ Explain in layman terms Measurement Uncertainty in the related discipline.</td>
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</tbody>
</table>
### GLT-TM-QA-01 – Advanced Quality Assurance Checklist

#### Required Readings/Materials

- Laboratory Operations Guide (LOG), as cited
- Respective discipline SOPs
- ASCLD/LAB-*International* Supplemental Requirements and Policies
- ANAB website
- Code of Criminal Procedure 38.01 (Texas Forensic Science Commission)
- Code of Criminal Procedure 38.35 (Evidence Admissibility, Accreditation)
- Code of Criminal Procedure 38.44 (Electronic Records)
- Code of Criminal Procedure 39 (Deposition and Discovery)
- Government Code 552 (Public Information Act)
- DPS Records Retention Policy/Schedule

#### Suggested Readings/Materials

- ANSI-ASQ National Accreditation Board (ANAB) Requirements
- QAS Standards for Forensic DNA Testing and Forensic DNA Databasing Laboratories

#### Supervised Performance

- Prepare document authorization form and document(s) for authorization (ISO 4.3)
- Prepare modification of external documents list (or electronic equivalent) for authorization (ISO 4.3)
- Prepare software authorization form and supporting documentation for approval (ISO 5.4.7.2)
- Prepare deviation request, including the form and supporting documentation (ISO 4.3)
- Prepare validation form for authorization (ISO 5.4)
- Review 5 quality incident/action plan records from at least 5 laboratory locations
- Initiate the quality incident process for a nonconforming event
- Evaluate root cause as part of a Quality Incident or Action Plan/Supplement and prepare the appropriate documentation (ISO 4.11)
<table>
<thead>
<tr>
<th>GLT-TM-QA-01 – Advanced Quality Assurance</th>
<th>Trainee Initials/Date</th>
<th>Trainer Initials/Date</th>
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<tbody>
<tr>
<td>☐ Prepare case record for open records release (ISO 4.13)</td>
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<td>☐ Prepare disposition log entry for record destruction</td>
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<tr>
<td>☐ Review training records and prepare forms for examiner approval (ISO 5.2)</td>
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<tr>
<td>☐ Review the equipment authorization list for approval</td>
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<tr>
<td>☐ Modify equipment authorization list for approval (ISO 5.5)</td>
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<td>☐ Archive testimony evaluation(s) upon approval (ISO 5.9.6)</td>
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<td>☐ Prepare a request for approval of vendor(s) (ISO 4.6)</td>
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<td>☐ Run QA crystal reports in LIMS (ISO 5.10)</td>
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<td>☐ Perform evidence reconciliation of a vault or location (optional)</td>
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<td>☐ Complete Internal Audit Auditor Training</td>
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<tr>
<td>☐ Complete the ISO Training/ANAB Assessor Training (as available)</td>
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Overview
The purpose of this document is to organize the employee’s training notebook for ease of review and archival. Pages shall be arranged in the order of this checklist. The GLT notebook content must be separated from discipline notebook content and submitted with a Certification of Completion (LAB-QA-31) for each unit. Notebook contents must be scanner-ready: one-sided only, staples removed, no protruding notebook dividers, steno pad page tearouts, thin, slick, over/undersized pages, or tearout pages with gum remaining; sticky notes must be taped down.

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<tr>
<th>Included</th>
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<tr>
<td><strong>Certification of Competency (LAB-QA-03) for discipline notebooks</strong></td>
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<td><strong>Certification of Completion (LAB-QA-31) for GLT notebooks</strong></td>
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<td><strong>Training log</strong></td>
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<td><strong>Memo requesting training modification plan</strong> (with QAC signoff), if applicable</td>
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<td><strong>Discipline training checklist(s)</strong> (with modifications/waivers clearly noted)</td>
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<td><strong>Module(s) in order of the Training Manual</strong></td>
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<td><strong>Cover page for module section</strong></td>
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<td><strong>Module required reading list</strong> (omitted readings noted)</td>
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<td><strong>Print-outs of training modules, only if the trainee documented completion of training elements on the printed copy</strong></td>
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<td><strong>Module exercises/competency samples</strong> (labeled with the corresponding module)</td>
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<td><strong>Module written exam, if applicable</strong> (labeled with the corresponding module)</td>
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<td><strong>Remediation for exercise, exam, competency, etc.</strong> (clearly marked as remediation and include trainer initials, date and evaluation)</td>
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<td><strong>Mock case(s)</strong>, if applicable</td>
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<td><strong>Comprehensive written exam</strong>, if applicable</td>
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<tr>
<td><strong>Reporting competency</strong> (if not already included in mock case)</td>
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<td><strong>Mock trial</strong> (completion or memo of expected completion)</td>
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Do not include:
- Previously submitted, reviewed, and/or archived notebook material
- Trainee’s notes, EXCEPT when required as a module exercise
- Reference materials (handouts/readings)
- Training certificates EXCEPT when required as part of the module (certificates shall be electronically archived)
- Transcripts, security codes, personal addresses, social security numbers, medical records, etc.
- SOPs