Instructional Laboratory Safety

University of Tennessee Safety Program LS-006

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Purpose
This document describes the safety program intended to protect faculty, staff, students, visitors, and the environment from hazards associated with instructional laboratories or similar experiential learning facilities. Stakeholder roles and responsibilities as well as basic risk mitigation strategies are included.

Scope and Applicability
This program applies to University of Tennessee, Knoxville (UTK) instructional laboratories or other experiential learning facilities where hazardous substances (biological, chemical, or radiological), hazardous procedures, or equipment are used. As per documented agreements, the program also extends to cover biological hazards and radiological materials at other UTK-area campuses and institutes, including the Institute of Agriculture (UTIA), College of Veterinary Medicine (CVM), and Graduate School of Medicine (GSM).

Definitions and Abbreviations

Definitions
Hazardous Substance – any biological, chemical, or radiological substance capable of causing injury.

Instructional Laboratory – facility where teaching, practical exercises, or other experiential learning occurs, including wet laboratories, dry laboratories, academic shops, or maker spaces.

Laboratory Supervisor/Coordinator – the individual with primary oversight responsibility for instructional laboratories.

Teaching Assistant – the individual (typically a graduate student) that delivers a range of teaching and assessment activities in the instructional laboratory, including assisting and monitoring students as they conduct experiments or practical exercises.

Chemical Hygiene Plan – a written plan which defines procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees from chemical hazards in that particular workplace.

Abbreviations
ACS: American Chemical Society
ASM: American Society for Microbiology
EHS: UTK Environmental Health and Safety
EPA: Environmental Protection Agency
GSM: Graduate School of Medicine
OSHA: Occupational Safety and Health Administration
Roles and Responsibilities

College Administration (Associate Dean for Academic Programs)

- Communicate the instructional laboratory safety program to all departments within the college and promote its implementation.
- Ensure departments are equipped with the appropriate facilities and safety equipment to support instructional laboratories.
- Promote safety as a fundamental component of experiential learning.
- Assist with resolution of safety concerns related to instructional laboratories as necessary.
- Conduct periodic reviews of the instructional laboratory safety program and recommend improvements as appropriate.

Department Head or Unit Leadership

- Communicate the instructional laboratory safety program to all laboratory supervisors or coordinators within the department and promote its implementation.
- Ensure that instructional laboratory staff (supervisors/coordinators and teaching assistants) are appropriately trained to manage the hazards in the laboratory as well as any emergencies that may result from their use.
- Ensure that departmental instructional laboratories and associated safety equipment and safety procedures are appropriate for the planned experiments or exercises.
- Verify that course syllabi and/or other supplemental materials explicitly communicate hazards/risks and appropriate protective measures.
- Promote safety as a fundamental component of experiential learning.
- Assist with resolution of safety concerns related to instructional laboratories as necessary.
- Conduct periodic reviews of the instructional laboratory safety program and recommend improvements as appropriate.

Laboratory Supervisor/Coordinator

- Follow applicable regulations, policies, procedures, and guidelines (e.g., those established by the American Chemical Society (ACS), American Society for Microbiology (ASM), or other relevant safety organizations) for the handling, storage, and disposal of hazardous substances.
- Complete relevant safety training and ensure that all staff, including teaching assistants, have completed training.
- Prepare a chemical hygiene plan (CHP) covering the chemical hazards of the instructional laboratory, as applicable. The CHP should include procedures for the preparation, use, and disposal of hazardous chemicals, particularly those that are carcinogenic, reproductive toxins, or acutely toxic.
- Ensure availability of safety data sheets (SDS) or other relevant hazard information.
Communicate the location of safety documents to affected staff and teaching assistants.

- Submit an inventory of hazardous substances (e.g., chemical inventory) to UTK EHS as required.
- Ensure that teaching assistant are appropriately trained to manage the hazards in the laboratory as well as any emergencies that may result from their use.
- Maintain instructional laboratory equipment and ensure that it is in good repair and functioning appropriately.
- Ensure hazardous wastes are appropriately segregated, labeled, and disposed.
- Determine the proper PPE to be worn for designated procedures. Methods for cleaning or replacing PPE should be established and communicated to instructional laboratory staff and students as applicable. (Note: PPE provisions and cost recoveries are at the discretion of departmental/college leadership.)
- Prepare a course syllabus and/or other supplemental materials to explicitly communicate the types of hazards used in the instructional laboratory, expected safety practices, and any special health considerations for students, particularly those that may require medical consultation. **Appendix A** is an example checklist that can be used for this purpose.
- When appropriate, emphasize new/unique risks and instruct teaching assistants on any special precautions that need to be taken.
- Instruct teaching assistants on emergencies that may arise in the instructional laboratory as well as respective emergency response procedures.
- Immediately notify EHS of any laboratory spills, accidents, exposures, or containment failures involving hazardous substances.
- Promote safety as a fundamental component of experiential learning and ensure students are not working alone in teaching labs.
- Assist with resolution of safety concerns related to instructional laboratories as necessary.
- Conduct periodic reviews of the instructional laboratory safety program and recommend improvements as appropriate.

**Teaching Assistant**

- Follow safety procedures and instructions provided by the laboratory supervisor/coordinator.
- Complete relevant training as indicated by the laboratory supervisor/coordinator, department, or EHS.
- Communicate and enforce safety requirements, including PPE use, in the instructional laboratory.
- When appropriate, emphasize new/unique risks and instruct students on any special precautions that need to be taken.
- Instruct students on emergencies that may arise in the instructional laboratory as well as respective emergency response procedures.
- Immediately notify the laboratory supervisor/coordinator of any laboratory spills, accidents, exposures, or containment failures involving hazardous substances. If the laboratory supervisor is unavailable, report to departmental leadership and/or EHS.
- Promote safety as a fundamental component of experiential learning and ensure students are not working alone in teaching labs.

**EHS**

- Establish and maintain a program for instructional laboratory safety.
• Partner with laboratory supervisors/coordinators to ensure that safety and relevant compliance objectives are met.
• Perform risk assessments and provide technical advice to instructional laboratory leadership as requested.
• Review or help develop guidance documents, technical bulletins, training slides or other instructional materials used to communicate the risks of working with hazards, prudent laboratory practices, health evaluation recommendations, and/or other risk mitigation strategies.
• Recommend or review PPE to be used in the instructional laboratory.
• Review or help develop emergency plans for handling accidental spills, exposures, or environmental releases.
• Investigate instructional laboratory incidents and make corrective action recommendations.
• Collect inventories of hazardous substances used in the instructional laboratory as necessary.
• Perform periodic laboratory safety reviews to verify facilities and prudent management of hazardous substances as indicated by relevant regulations, policies, procedures, and guidelines.
• Report any significant problems or teaching-related accidents or illnesses to the relevant safety committees and departmental/college leadership as appropriate.

References
The following apply to the possession, use and transfer of biological hazards. In case of conflicting requirements between regulations, consensus standards, and/or UTK policies, programs, etc., the more protective requirements shall prevail, as applicable.

Regulations and Consensus Standards
29 CFR 1910.1030 OSHA Bloodborne Pathogens Standard
40 CFR, Part 725 (EPA)
Centers for Disease Control and Prevention/National Institutes of Health Biosafety in Microbiological and Biomedical Laboratories, 6th ed. (2020)
TDEC Rule 0400-11-01-.04(2)(k)(4) (Regulated Medical Wastes)

UT Policy
UT System Safety Policy SA0100 – Safety and Environmental Health Program
UT System Safety Policy SA0300 – Ionizing Radiation Safety
UT System Safety Policy SA0450 – Biological & Select Agents
UT System Safety Policy SA0500 – Laser Safety

UTK Programs, Procedures, Plans, and Guides
UTK Biological Safety Program – BS-001
UTK Hazardous Waste Management Plan – EC-001
UTK Laboratory Health & Safety Program – LS-001

Appendices
Appendix A - Instructional Laboratory Safety Information Verification
Disclaimer
The information provided in these guidelines is designed for educational use only and is not a substitute for specific training or experience.

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## Appendix A: Instructional Laboratory Safety Information Verification

<table>
<thead>
<tr>
<th>Course Name</th>
<th></th>
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<tbody>
<tr>
<td>Course Code(s)</td>
<td></td>
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<tr>
<td>Dates Reviewed</td>
<td></td>
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<tr>
<td>Departmental Reviewer</td>
<td></td>
</tr>
<tr>
<td>EHS Reviewer (optional)</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Y/N/NA</th>
<th>Comments</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lab Attire</td>
<td>Explicit statements must be made about appropriate and inappropriate lab attire.</td>
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<tr>
<td></td>
<td></td>
<td>No open-toed shoes are permitted in any labs.</td>
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<td></td>
<td>Ensure appropriate apparel (e.g., no shorts, no skin showing)</td>
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<td></td>
<td>Consider if certain tops (e.g., tank tops, exposed shoulders) should not be permitted.</td>
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<td></td>
<td></td>
<td>Explicitly state the consequences for arriving at lab in inappropriate attire.</td>
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<tr>
<td></td>
<td>Personal Protective Equipment</td>
<td>State PPE requirements for the lab (e.g., disposable nitrile gloves, chemical apron, eyewear protection, etc.).</td>
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<td></td>
<td></td>
<td>State when specialized PPE is required and how the information will be provided to the students (e.g., TAs will instruct students during the experiment about specialized PPE).</td>
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<td>The consequences for violating PPE requirements must be explicitly stated.</td>
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<td></td>
<td>Behavior</td>
<td>No food or drink policy</td>
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<td></td>
<td></td>
<td>Explicitly state that disruptive or destructive behavior will not be tolerated</td>
</tr>
<tr>
<td>Y/N/NA</td>
<td>Comments</td>
<td>Requirement</td>
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<td></td>
<td>Electronics policy if necessary. Such a policy should include when personal electronics are allowed and not allowed, administrative controls (e.g., only wearing one glove) and how to decontaminate electronics. The same should be stated for lab-provided electronics.</td>
</tr>
</tbody>
</table>

**Emergencies**

|        |          | Students must be informed of emergency procedures, locations of emergency equipment (e.g., eyewash, safety shower, etc.), and how to use appropriately. |

**Incident Reporting**

|        |          | Explicitly state that a student must immediately inform a TA or instructor of any emergency, including spills, injuries, or exposures. |

**Health Considerations**

|        |          | Any health issues that may enhance the risk to the individual should be stated (e.g., pregnancy, organ impairments, immunological disorders, allergies, medications, etc.). Consultation with a medical professional should be advised as applicable. |

**Waste Disposal**

|        |          | A universal statement about appropriate disposal of hazardous reagents should be included. Specific waste disposal instructions must be included in each experimental procedure. |

**Other comments**