Advanced Lab Safety and Biosafety Training Course

Professional Development Training Course Outline

Category	Biotechnology and Pharmaceutical Development	**Duration**	10 Days
Base Fee	$4,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The rapidly evolving landscape of Biomedical Research and Global Health Security necessitates that laboratory professionals possess an Advanced and nuanced comprehension of Biorisk Management (BRM). This intensive course transcends basic compliance, focusing on the critical differentiation and implementation of protocols across all Biosafety Levels, with a heavy emphasis on high-containment practices. In an era defined by Emerging Infectious Diseases and Dual Use Research of Concern (DURC), sophisticated control measures and a proactive Culture of Safety are non-negotiable pillars of laboratory integrity. Participants will master the advanced tools and methodologies required for managing complex biological hazards, ensuring both personnel protection and national/global security.

Advanced Lab Safety and Biosafety Training Course is specifically engineered for Senior Laboratory Personnel and Biosafety Leadership, moving beyond foundational concepts to engage with the Regulatory Landscape and the practicalities of facility design and crisis management. The curriculum is centered on developing exceptional Hazard Identification and Risk Assessment competencies, using Real-World Case Studies of containment breaches and new technology implementation. By integrating the latest international guidelines with advanced engineering controls, the course certifies experts capable of establishing, auditing, and sustaining a World-Class Biocontainment Program against the backdrop of increasing complexity and scrutiny.

Programme Curriculum

Advanced Lab Safety and Biosafety Training Course

Introduction

The rapidly evolving landscape of Biomedical Research and Global Health Security necessitates that laboratory professionals possess an Advanced and nuanced comprehension of Biorisk Management (BRM). This intensive course transcends basic compliance, focusing on the critical differentiation and implementation of protocols across all Biosafety Levels, with a heavy emphasis on high-containment practices. In an era defined by Emerging Infectious Diseases and Dual Use Research of Concern (DURC), sophisticated control measures and a proactive Culture of Safety are non-negotiable pillars of laboratory integrity. Participants will master the advanced tools and methodologies required for managing complex biological hazards, ensuring both personnel protection and national/global security.

Advanced Lab Safety and Biosafety Training Course is specifically engineered for Senior Laboratory Personnel and Biosafety Leadership, moving beyond foundational concepts to engage with the Regulatory Landscape and the practicalities of facility design and crisis management. The curriculum is centered on developing exceptional Hazard Identification and Risk Assessment competencies, using Real-World Case Studies of containment breaches and new technology implementation. By integrating the latest international guidelines with advanced engineering controls, the course certifies experts capable of establishing, auditing, and sustaining a World-Class Biocontainment Program against the backdrop of increasing complexity and scrutiny.

Course Duration

10 days

Course Objectives

Upon completion, participants will be able to:

1. Differentiate the engineering controls, practices, and facility requirements for BSL-1 through BSL-4 and ABSL-3/4 environments.
2. Perform comprehensive Biohazard Risk Assessment using a tiered, multi-factor approach for novel and Select Agents.
3. Design and implement site-specific Exposure Control Plans compliant with the latest OSHA and NIH Recombinant DNA Guidelines.
4. Master the selection, proper use, and rigorous Validation of Advanced Personal Protective Equipment, including Powered Air-Purifying Respirators and positive-pressure suits.
5. Develop and execute robust Emergency Response Plans for large-scale biohazardous spills, aerosol releases, and facility containment breaches.
6. Critique and ensure the performance of Primary Containment equipment, focusing on the certification and advanced troubleshooting of Biological Safety Cabinets
7. Integrate Biosecurity and Accountability protocols, including Access Control Systems and the management of Dual Use Research of Concern.
8. Conduct Gap Analyses and implement quality management systems to achieve and maintain international standards and Accreditation for high-containment laboratories.
9. Apply principles of Decontamination and Sterilization, including gaseous fumigation and validated effluent treatment systems.
10. Advise on the Facility Design and commissioning process for new BSL-3/4 laboratories, including HVAC and pressure cascade systems.
11. Establish a sustainable Culture of Safety and mentor junior staff in best practices through effective Safety Leadership.
12. Manage and dispose of complex Biohazardous Waste and Pathological Waste according to IATA/DOT transport regulations and national guidelines.

13. Analyze and mitigate the biosafety risks associated with Emerging Technologies like CRISPR-Cas9, Synthetic Biology, and large-scale fermentation.

Target Audience

1. Biosafety Officers (BSOs) and Assistant BSOs.
2. Laboratory Managers and Supervisors overseeing BSL-3 and BSL-4 operations.
3. Principal Investigators (PIs) conducting high-risk or Recombinant DNA research.
4. Members of the Institutional Biosafety Committee (IBC) and IACUC.
5. Environmental Health & Safety (EH&S) Professionals and Auditors.
6. Facility Engineers and Maintenance Staff responsible for BSL-3/4 infrastructure.
7. Senior Research Technicians and Post-Doctoral Fellows in high-containment areas.
8. Security Personnel and Incident Commanders involved in emergency response for bio-facilities.

Course Modules

Module 1: The Foundational Biorisk Management (BRM) Framework

- Risk Assessment, Mitigation, Performance, and continuous review.
- International and National Regulatory Landscape.
- Defining and differentiating Biosafety and Biosecurity
- Risk Group (RG) Classification of infectious agents and corresponding BSL assignment.
- Case Study: Analyzing the impact of a breach in a BSL-2+ lab that led to an agent leaving the premises.

Module 2: Advanced Biohazard Risk Assessment (BRA)

- Pathogen characteristics, Procedures, and Personnel competency/health.
- Developing agent-specific and Activity-Specific Risk Assessments.
- Quantitative vs. Qualitative risk matrices and risk acceptance criteria.
- Elimination, Substitution, Engineering, Administrative, and PPE controls.
- Case Study: Assessing the risk of working with a novel Hantavirus strain in a BSL-3 setting with limited animal model data.

Module 3: Biosafety Level 3 (BSL-3) Design and Practice

- Design and engineering of the primary barrier, including the two-door access rule and anteroom.
- Principles of negative pressure and continuous monitoring/alarm systems.
- Medical surveillance, immunization policies, and the ?Ç£buddy system.?Ç¥
- Validation of surface disinfectants and use of in-house autoclaves for all materials exiting the lab.
- Case Study: Reviewing the operational failure of a BSL-3 ventilation system and the ensuing emergency response protocol.

Module 4: High-Containment (BSL-4) and Exotic Agents

- Suit laboratories versus cabinet laboratories.
- Donning, doffing, life-support systems, and chemical shower procedures.
- Design, validation, and real-time monitoring of liquid waste treatment.
- Handling of Exotic High-Consequence Pathogens and lack of available treatment/vaccines.
- Case Study: Scenario-based training on a breach in a positive-pressure suit and the subsequent emergency doffing/decontamination procedure.

Module 5: Primary Containment: Biological Safety Cabinets

- In-depth comparison of BSC Class I, II (A1/A2, B1/B2), and III functionalities and selection criteria.
- Understanding and maintaining HEPA Filtration integrity
- Sash height, material loading, burner use, and minimizing turbulence.
- Advanced troubleshooting for airflow alarms and decontamination within the cabinet.
- Case Study: Auditing a BSL-3 laboratory where an incorrectly certified BSC led to persistent low-level contamination.

Module 6: Personal Protective Equipment (PPE) Advanced Selection & Doffing

- Risk-based selection of PPE.
- Quantitative fit testing, medical clearance, and maintenance of PAPRs.
- Validated Doffing Procedures for eliminating cross-contamination during removal.
- Selecting chemical-resistant and liquid-impervious protective clothing and eye protection.
- Case Study: Analyzing an employee exposure incident caused by improper doffing technique after working with an aerosolized agent.

Module 7: Biohazardous Waste Management

- Solid, liquid, pathological, and sharps waste disposal procedures.
- Compliance with DOT/IATA Regulations for transport of Category A and Category B infectious substances.
- Cycle validation, challenge testing, and record-keeping.
- Management of large-scale animal carcass and tissue waste in ABSL facilities.
- Case Study: A logistics failure where improperly packaged bio-waste triggered a regulatory violation during off-site transport.

Module 8: Emergency Response & Crisis Management

- Developing and testing a comprehensive Biohazard Emergency Response Plan
- Detailed protocols for major and minor Aerosol Spills and personal exposure.
- Activation of the Incident Command System (ICS) for laboratory incidents.
- Post-Incident Decontamination and facility clearance procedures.
- Case Study: Simulating a power outage and loss of negative pressure during a procedure with a high-consequence pathogen.

Module 9: Biosecurity and Dual Use Research of Concern (DURC)

- Implementing Multi-Factor Access Control and personnel reliability programs.
- Regulatory requirements and ethical considerations for DURC screening and mitigation.
- Managing and securing Select Agents and Toxins (SAT) under federal programs.
- Inventory control, accountability, and transfer procedures for high-consequence agents.
- Case Study: Evaluating a research proposal to identify potential DURC concerns related to increasing pathogen virulence.

Module 10: Facility Commissioning and Maintenance

- HEPA filter integrity testing and air change rate verification.
- Design review, functional testing, and final validation for BSL-3/4.
- Preventative maintenance protocols for primary containment equipment and emergency power.
- Developing safe work permits and procedures for external contractors in high-containment areas.

- Case Study: Analyzing the impact of delayed maintenance on a critical BSL-3 component leading to temporary operational shutdown.

Module 11: Advanced Topics in Decontamination

- Gaseous Decontamination validation.
- Calculating contact time and concentration for chemical disinfectants against specific biological threats.
- Surface sampling and clearance testing protocols post-decontamination.
- Decontamination of heat-sensitive equipment and complex robotics.
- Case Study: Designing and executing a full VHP decontamination cycle for an entire BSL-3 suite following a major facility renovation.

Module 12: Auditing, Compliance, and Quality Management Systems (QMS)

- Developing an internal Audit Checklist based on international standards
- Implementing a QMS for continuous improvement in biosafety and facility operations.
- Gap analysis and strategies for achieving formal laboratory Accreditation.
- Training records, SOPs, exposure monitoring, and incident reports.
- Case Study: Conducting a mock-accreditation audit on a BSL-3 laboratory, identifying major non-conformities and developing a corrective action plan.

Module 13: Safety Leadership and Culture of Safety

- Transitioning from compliance to a proactive **Culture of Safety**.
- Strategies for effective communication and mandatory safety training (**Refresher Training**).
- The role of **Safety Leadership** in incident prevention and reporting without fear of reprisal.
- Analyzing behavioral safety: Human factors engineering and error reduction strategies.
- Case Study: Reviewing the organizational factors that contributed to a major laboratory-acquired infection (**LAI**) and the subsequent cultural change implemented.

Module 14: Animal Biosafety Levels

- Distinct requirements for Animal Biosafety Levels versus BSL
- Protocols for handling, housing, and administering agents to large and small animal models.
- Carcass disposal, bedding, and waste stream decontamination for vivaria.
- Emergency protocols for animal escape or distress in a high-containment environment.
- Case Study: Developing a detailed ABSL-3 protocol for an aerosol challenge study on non-human primates.

Module 15: Emerging Biological Technologies & Risk

- Assessing the unique biosafety risks of Synthetic Biology and the creation of novel agents.
- Containment strategies for CRISPR-Cas9 and other advanced gene-editing technologies.
- Biosafety considerations for Nanotechnology and the use of robotic automation in containment labs.
- The use of Digital Twins and AI-driven monitoring systems for real-time risk assessment.
- Case Study: Evaluating a Recombinant DNA protocol for generating a novel viral vector and advising the IBC on appropriate BSL assignment and mitigation.

Training Methodology

The course employs a highly interactive and practical methodology designed for experienced professionals:

- Interactive Lectures and Seminars.
- In-Depth Case Studies.
- Scenario-Based Training.
- Practical Workshops.
- Facility Audits.

Register as a group from 3 participants for a Discount

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

Certification

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

Tailor-Made Course

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

Key Notes

a. The participant must be conversant with English.

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

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

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

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

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

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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

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

Register Online Now

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