BIOSAFETY-EUROPE

List of existing Biosafety/Biosecurity training programmes, courses, workshops

SIXTH FRAMEWORK
PROGRAMME

The two tables below list available training courses A) in Europe and B) outside Europe. Our aim is to provide an overview without either being comprehensive or giving recommendations based on quality evaluations. Some of the European courses are described in more details in supplementary text below the tables.

Remarkably, far more courses are provided in the US and Canada than in EU member states.

Table A: Training courses in Europe.

No.	Country	Course provider, address	Topics covered	Target group
1	Belgium *	Scientific Institute of Public Health - Service of Biosafety and Biotechnology, Mr. William Moens, Rue J. Wytsmanstraat 14, Brussels, Belgium, B-1050, no URL available	Data management and information-sharing, General biosafety, Identification of LMOs, Regulatory regimes, Risk assessment and risk management, Precautionary approach	Government officials, technical personnel, natural and life science scientists, lawyers, social scientists, bioethicists, economists Course language: Dutch
2	Europe	European Biosafety Association (EBSA) c/o DECHEMA, Frankfurt am Main	Annual Meeting, Pre-conference workshops	Biosafety professionals Course language: English
3	Europe	European Training in Infectious Disease Emergencies (ETIDE) http://ec.europa.eu/health/ph_projects/2005/action2/action2_2005_2_en.htm	Training module for lab workers, covering biosafety and biocontainment within BSL1-4 settings, safe sampling and sample handling, safe transport of specimens, risk-based classification of pathogens, diagnostic procedures for emergent bacterial and viral (including Class 3 and Class 4 agents, alerting mechanisms and communications skills, for use in the onsite training course at INMI and wider dissemination via the ETIDE website.	Laboratory staff, emergency workers, medical staff Course language: English

No.	Country	Course provider, address	Topics covered	Target group
4	Germany	Berufsgenossenschaft der chemischen Industrie (BG Chemie)	1.) „Biosafety officers in biological laboratories“ 2.) Safe biotechnology: Natural biological agents and genetically modified organisms (GMOs) (state approved course)	1.) Biosafety officers in microbiology or biotechnology labs 2.) Lab staff working with biological agents, biosafety officers and project leaders (GenTSV), specialists in workers' protection and occupational health. Course language: German
5	Germany	Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA)	Biostoffverordnung (Biological agents Ordinance): Legislation, risk assessment, workshops to develop a risk assessment for specific activities (e.g. laboratories, health care, agriculture)	Employers, occupational medical practitioner, competent authorities, specialists in workers' protection Course language: German
6	Germany	Forschungszentrum Karlsruhe, Fortbildungszentrum für Technik und Umwelt http:// fortbildung.fzk.de/	1.) "Projektleiter und Beauftragter für die biologische Sicherheit": Sachkunde nach § 15 GenTSV (GMO): legislation GMO, risk assessment, classification in risk groups, containment levels and safety measures, 2.) "Tätigkeiten mit biologischen Arbeitsstoffen" (activities with biological agents): Legislation, risk assessment, classification in risk groups, containment levels and safety measures, occupational medical prevention, best practice	1.) Biosafety officers, project managers 2.) Biosafety officers, employer, occupational medical practitioner, competent authorities, specialists for workers' protection Course language: German
7 *	Germany	Hannover Medical School, Hannover, Germany www.mhh.de	Course on risk assessment, safety measures, principles of legislation and workers´ protection	Life scientists and medical doctors who as project leaders or biosafety officers will be responsible for the conduct of genetic engineering experiments in Germany Course language: English
8 *	Germany	Institute of Virology, Georg-August-Universität, Göttingen, Germany -	BSL3 training course: Practical knowledge on safety precautions and procedures needed to run a BSL3 laboratory	The programme aims at training people new to BSL3 work but also addresses people that have experiences in BSL3 work but feel the need to upgrade their skills to up to date standards

No.	Country	Course provider, address	Topics covered	Target group
9	Germany	Universities, e.g. Bonn, Tübingen, Freiburg	"Projektleiter und Beauftragter für die biologische Sicherheit": Sachkunde nach § 15 GenTSV (GMO): legislation GMO, risk assessment, classification in risk groups, containment levels and safety measures,	Biosafety officers, project managers
10 *	Sweden	Smittskyddsinsitute, Solna, Sweden	Biosafety in microbiological laboratories	The course is part of a credit system for the students who have to finish it with an examination Course language: Swedish
11 *	Switzerland	Swiss BIOSAFETY curriculum: b-safe GmbH, Fabrikstrasse 29, CH-3012 Bern Basler & Hofmann, Ingenieure und Planer AG, Forchstr. 395, CH-8032 Zürich	General biosafety, Risk assessment and risk management, Biotechnology	Biosafety officials, biosafety commissions, biotech industry and laboratories, research institutes and scientists, decision makers, lawyers, federal agencies or other professionals who need to have knowledge in biosafety
12 *	UK	Health Protection Agency	BSL3 training, live agent training with BL3 agents, decontamination etc,: "Principles and practices at working at ACDP containment Level 3"	Laboratory staff, scientists, safety officers, managers Course language: English
13	UK	University of Edinburgh, Health and Safety Department, 9-16 Chambers St, Edinburgh EH1 1HT, United Kingdom	1.) An Introduction to Biosafety, 2.) Safety Requirements for Work Involving Genetic Modification, 3.) Microbiological Safety Cabinets, 4.) Transport of Biological Materials	University staff working with pathogenic or modified organisms Course language: English
14	UK	MRC Medical Research Council Health, Safety and Security	The MRC is funded by the UK Government and receives an annual Grant in aid from Parliament via the Office of Science and Technology	Biosafety officers Course language: English

No.	Country	Course provider, address	Topics covered	Target group
15	UK	Institute of Safety in Technology and Research	A foundation level (Level 1) course in Biosafety and Biosecurity is in an advanced planning stage and training organisations will be recruited to teach to the syllabus developed by the Institute who will accredit them against a set of learning outcomes	Persons newly appointed to a position in biosafety Course language: English
16	UK	Institute of Safety in Technology and Research	Qualification as a Biosafety Professional (BSP, Level 2) based upon portfolio development will be based on a series of modules, some compulsory, others optional	Persons who have achieved the Level 1 standard and are now working as BSOs or in an equivalent full time occupation Course language: English
17 *	The Netherlands	The GMO office under responsibility of the Ministry of VROM in cooperation with the Dutch Association BVF Platform a platform for biological safety officers:	"Position and training of the biosafety officer", 2-days course to comply with GMO regulations of The Netherlands (Legislation (GMO, infectious agents, plant/animal quarantine organisms), risk assessment, containment principles, transport, disinfection, waste management, incidents, preparing a notification and discussing the final licence, and other practical issues)	Biological safety officers. Course language: Dutch.
18	Norway	DNV Biorisk Veritasveien 1 1322 Høvik E-mail: biorisk@dnv.com	1) Risk management principles and risk assessment methodologies. 2) Concepts, principles and requirements of the CWA 15793 Laboratory Biorisk Management Standard. 3) Understanding the Insider Threat: Biocontainment Facilities	Laboratory executives and managers, Principal investigators, Biological safety officers, Occupational health, safety, environmental and quality (HSEQ) professionals, Biosafety committee members and Regulators.

Table B: Training courses outside Europe.

No.	Country	Course provider, address	Topics covered	Target group
1	Australia	The University of Queensland, Brisbane QLD 4072 Australia	General Biosafety, Transport of biological Material, Regulation of biological material in Australia including PC2	New staff with little experience in biological facilities, post graduate students and people from overseas who may not be aware of current Australian requirements
2	Canada	Office of Laboratory Security Public Health Agency of Canada And Biohazard Containment and Safety Division of the Canadian Food Inspection Agency Ottawa, Canada	Design and operational concepts associated with Canadian Level 3 laboratories, process from inception to certification. Discussion of the Canadian containment standards, of both human and animal	For biosafety professionals, level 3 facility users and managers, engineers, architects, and other personnel involved in designing or managing level 3 facilities
3	Canada	Canadian Science Centre for Human and Animal Health (CSCHAH)	Verification of directional airflow (smoke testing procedures), Verification of containment barrier (pressure decay tests), Control and balance of airflow (fail-safe operation), Large scale decontamination of laboratories (formaldehyde fumigation, VHP application), Biological assessment/ validation, Biological safety cabinets in high containment, HEPA filters (bag-in and bag-out procedures, decontamination, testing), Level 4 positive pressure suits, Respiratory protection (qualitative and quantitative testing), Verification of decontamination (Alkaline digester, liquid waste pressure vessels), Irradiation of samples	Experienced biosafety professionals. Candidates are selected due to limited course availability

No.	Country	Course provider, address	Topics covered	Target group
4	Canada	Simon Fraser University, 8888 University Drive Burnaby, British Columbia, Canada V5A 1S6	Biosafety session: Risk groups- safety techniques- biosafety cabinets- autoclaving- working with animals- chemical biosafety- policy and permits- pathogen importation- radioactive biohazards Spill response session: Acid, Base and solvent spills- liquid neutralization- spill cleanup Non-laboratory worker safety session: Session designed for non-laboratory workers required enter labs.	Universtity staff and externals. The access for externals is limited and depending on the prioritary internal demand
5	Canada	University of Manitoba, Winnipeg, MB R3T 2N2 Canada	General Laboratory Biosafety Concepts and Guidelines, Laboratory Standard Operating Procedures, Containment of Infectious Agents, Risk Assessment, Environmental Safety, Decontamination, Laboratory Design, Hospital Infection Control, Shipping and Transportation, Bioterrorism	For students
6	Canada	The University of Western Ontario, 1151 Richmond Street, Suite 2, London, Ontario, Canada, N6A 5B8	Biosafety (Course outline available online) Process of risk assessment, concept of containment level, how a biological safety cabinet works and it's role in a biohazard laboratory, accidental exposure or spills risks associated with human blood and body fluids	University staff working with micro-organisms, cell cultures, human blood etc
7	Canada	University of Saskatchewan, 25 Campus Drive, Saskatoon, Saskatchewan, Canada, S7N 5A7	Biosafety regulations, University Policies and Procedures pertaining to Biosafety, exposure routes, selection and use of PPE, biosafety cabinets, laboratory acquired infections and prevention, biosafety considerations when working with animals or plants, importation of pathogens or animal by-products, and the safe use, storage and disposal of biological materials	University staff concerned

No.	Country	Course provider, address	Topics covered	Target group
8	Canada	The University of British Columbia 2329 West Mall Vancouver, BC Canada V6T 1Z4	Laboratory Biological Safety Course: Risk Factors of Biohazardous Agents (Definition of Biohazards, Routes of Exposure), Film Practicing Safe Science, Personal Protective Equipment, Containment Facilities and the Hazards Associated with Laboratory Equipment, Decontamination/ Sterilization Procedures, Disposal Procedures for Biohazardous Waste, Emergency Response, Handling of Biological Spills, Laboratory Inspections and Accident Investigation and Reporting Effective Use of Biological Safety Cabinets Hands on demonstration of Fume Hoods/Biological Safety Cabinets	University staff working at BSL2 or higher
9	Canada	International Center for Infectious Diseases, 730 William Avenue, Winnipeg, MB, CANADA R3A 0W3	Trainingsprogramm: "The Ecology of Infectious Diseases". Basis course: Presentation of scientific projects + 2 projects to be completed by the candidates (one major long term project, a second of 3 months)	BSc in medecine, PhD, MD
10	Japan *	University of Tsukuba, Mrs. Ito Kazuko, Gene Research Center, 1-1-1 Tennoudai, Tsukuba, Japan, 305-8572	Food and feed products containing GMOs, Institutional development, Technology transfer, General biosafety, Identification of LMOs, Public awareness, education and participation, Regulatory regimes (laws and regulations), Risk assessment and risk management, Biotechnology	Beginner on the subject but for Mid level administrator, research manager, lab leader

No.	Country	Course provider, address	Topics covered	Target group
11	New Zealand *	University of Canterbury, Mr Jack Heinemann, Private Bag 4800, Christchurch, Keine URL verfügbar	Full range of biotechnologies, Regulation and policy-making, General biosafety, Identification of LMOs, Information exchange and data management, Public awareness, education and participation, Liability and redress, Systems for handling applications, Risk assessment and risk management, Socio-economic considerations, Ethical aspects, Environmental, food and feed safety	Under- and Graduate students, natural and life science scientists, lawyers, social scientists, bioethicists, economists
12	Singapore	Chemcare Asia Consultants, Crawford Post Office, PO Box 846, Singapore 911912	Consulting and training courses in Asia.	No information available
13	USA	John Hopkins University, Institutions Health Safety & Environment, 600 N. Wolfe Street, Baltimore, Maryland 21205, USA	1.) Safe Laboratory Practices for BSL1 and BSL2, 2.) Bloodborne Human Pathogen Training	University staff
14	USA	World Bio Haztec, 5105 Rae Court NE, Rio Rancho, NM 87144	"Your employees are a crucial component to the functioning of your laboratory. World BioHazTec can provide training sessions for your employees. Since each bio-containment facility is unique, we will tailor our sessions to ensure site specificity."	No information available
15	USA	American Biological Safety Association (ABSA)	Various topics concerning biosafety	Biosafety professionals of all levels
16	USA	Yale University, Office of Environmental Health & Safety, 135 College Street, New Haven, CT 06510	1.) Biosafety training; The course focuses on good microbiological practices, safety equipment, and containment. We also review emergency response procedures and Yale Biosafety Policies 2.) Blood-borne pathogens training; 3.) Safe use of biological safety cabinets 4.) Advanced biosafety seminar 5.) Transport of biological agents	A.) course for employees working at Biosafety Level 2, new employees B.) For employees that work in a Research or Clinical Laboratory, Clinic or Patient care environment. C.) People working with BSC D-E.) Employees prior to initiating experiments with agents classified at BL2+, BL3, or BL3+.

No.	Country	Course provider, address	Topics covered	Target group
17	USA	Indian University-Purdue University Indianapolis, ES 2126 902 W. New York St. Indianapolis, IN 46202 USA	Training in biosafety, Blood-borne pathogens training	University staff starting to work with blood-borne pathogens
18	USA	The University of Arizona, Tucson AZ 85721	Blood-borne pathogens training	University staff working with blood-borne pathogens
19	USA	University of California, Berkeley, Office of Environment Health and Safety, Berkeley, CA 94720	Biohazard Use Authorization (BUA), OSHA Blood-borne Pathogens Standard, Biosafety Cabinets (online Training)	University staff working with rDNA-material, blood-borne pathogens et
20	USA	Wayne State University, 5425 Woodward Ave., Detroit, Michigan 48202	Explanation of Biosafety Principles and Levels from CDC/NIH, Contents of the WSU Biosafety Manual & Exposure Control Plan (29 CFR 1910.1030), Explanation of bloodborne infectious diseases, Procedures to follow in an exposure incident, Safe work practices, PPE, Use of biological safety cabinets and other safety equipment, Biohazard waste disposal rules, and much more.	University staff
21	USA	Vanderbilt University, Vanderbilt Environmental Health and Safety, 2201 West End Avenue, Nashville, Tennessee 37235	Basics of Biosafety, Biosafety Level Training (Level I, Principles & Practices of Biosafety, Level III), Bloodborne Pathogen, Roles & Responsibilities in Biosafety, Roles & Responsibilities in Conducting Human Gene Transfer Trials, Shipping Infectious Materials	Any staff/faculty exposed to blood or body fluids, Investigators and research staff members using infectious agents and/or recombinant DNA techniques
22	USA	University of California, San Diego, Office of Admissions and Relations with Schools, 9500 Gilman Dr., 0021, 301 University Center, La Jolla, CA 92093-0021	Blood-borne Pathogens (BBP), Viral Vectors, Orientation to Animal Research, Biosafety Level 3 Facility Training, Biosafety: Principles	University staff working with body liquids or viral vectors

No.	Country	Course provider, address	Topics covered	Target group
23	USA	New Mexico State University, P.O. Box 30001, Las Cruces, NM 88003-8001	Biosafety (Lab Biosafety) Training, Blood-borne Pathogenes	Open to all NMSU faculty, staff and students this training is required for laboratory staff working at Biosafety Level II
24	USA	University of Wisconsin Madison, Safety Department, 30 North Murray Street, Madison, WI 53715-1227	Roles and responsibilities of researchers, Institutional Biosafety Committee, etc. - Risk assessment fundamentals - Good laboratory practices and precautions for biosafety level 1 and 2 - Types of containment equipment - Proper disposal of biological materials, including sharps and infectious agents - Emergency preparedness	All university staff and students starting lab work
25	USA	University of South Florida, 12901 Bruce B. Downs Blvd, MDC35, Tampa, FL 33612-4799	OSHA Blood-borne Pathogens, Principles and Practices of Biosafety, Management of biological waste	For university staff and students
26	USA	University of Dentistry and Medicine New Jersey, 65 Bergen Street, Room 1328 *University Heights Newark, New Jersey 07107-3001	Lab-Acquired infections, and safe use use of biological safety cabinets and other laboratory equipment	Laboratory personnel who handle blood, human tissue, human cell lines or pathogens
27	USA	University of California San Francisco, San Francisco, CA 94143, 415/476-9000	Blood-borne Pathogens Initial Training	Employees working with human source materials or cell cultures
28	USA	Brown University Box 1920 Providence RI 02912	Biosafety Training, Blood-borne Pathogen	Laboratory personnel who handle blood, human tissue, human cell lines or pathogens

No.	Country	Course provider, address	Topics covered	Target group
29	USA	Wake Forest University School of Medicine, Medical Center Boulevard Winston-Salem, NC 27157	Blood-borne Pathogen, Infection Control for Clinical Personnel, Basic Lab Safety with Animal Contact	Lab workers using human or animal material, containing a human pathogen, all clinical personnel, personnel working with research animals
30	USA	Boston College 140 Commonwealth Avenue Chestnut Hill, MA 02467	Biosafety Training, Blood-borne Pathogens	Health care workers, police, housekeeping, plumbers and laboratory personnel
31	USA	University of Hawai'i System (Maui Community College, 310 Ka'ahumanu, Kahului, HI 96732)	Biological Agents and Blood-borne Pathogen Standards, General Biological Safety, Biological Wastes Management	No information given
32	USA	The University of Texas Health Science Center at San Antonio 7703 Floyd Curl Drive, San Antonio, TX 78229-3900	Basic Blood-borne Pathogen, Basic Biosafety Training	University staff
33	USA	Michigan State University, Office of Radiation, Chemical & Biological Safety, C124 Research Complex - Engineering East Lansing, MI 48824-1326	Biological Safety, Blood-borne Pathogen	University staff working with pathogens.
34	USA	University of California, Davis, One Shields Avenue, Davis, CA 95616	Biological Safety and Medical Waste Management	Laboratory personnel who handle blood, human tissue, human cell lines or pathogens
35	USA	USAMRIID 1425 Porter Street ATTN: MCMR-UIM-O (Chief, Training, and Education Dept.) Fort Detrick, MD 21702-5011	Classroom discussion includes the history and current threat of chemical and biological agent use, the characteristics of threat agents, the pathophysiology and treatment of agent exposure, and the principles of field management of threat agent casualties.	The course is designed for Medical Corps and Nurse Corps officers; physician assistants; Medical Service Corps officers in specialties 67B, C, or E; and other selected medical professionals.

No.	Country	Course provider, address	Topics covered	Target group
36	USA	University of Missouri, Columbia, Environmental Health and Safety, 8 Research Park Development Building Columbia, Missouri 65211	Introduction to Biosafety, Biohazard Awareness, Blood-borne Pathogen Awareness, Blood--borne Pathogen Safety, Hood and Biosafety Cabinet Safety	Universitätsangestellte und Studenten die in Biosicherheitslabors der Kategorie 2 und höher arbeiten.
37	USA	University of Pennsylvania, 3451 Walnut Street, Philadelphia, PA 19104	Course content: Overview of safe work practices in a biomedical research laboratory, including chemical safety, biosafety and bloodborne pathogens	All faculty, staff and students at the University who work in a laboratory must attend this training
38	USA	Midwest Regional Center for Excellence for Biodefense and Emerging Infectious Disease Research	Biosafety Fellowship program	M.D. oder Ph.D., US citizens only
39	USA	National Biosafety and Biocontainment Program Frontline Healthcare Workers Safety Foundation, Ltd. Three Dunwoody Park South, Suite 103 Atlanta, GA 30338	Provide a rare opportunity to receive professional training in biosafety and biocontainment Fellows will train specifically to support Biosafety Level 3 and 4 research environments by acquiring knowledge and skills necessary to meet the scientific, regulatory, biocontainment, biosafety, engineering, communications, management, and public relations challenges associated with the conduct of research in these facilities	For applicants with academic degree(s) in microbiology, public health, or other allied sciences
40	USA	The NIH training initiative		
41	USA	University of Texas, 7000 Fannin Street, Houston, Texas 77030	In addition to providing useful information regarding exposure to hazardous substances and biological agents, the training classes offer very useful information regarding how to obtain MSDS, how to dispose of hazardous wastes, and what to do in the event of an emergency	Training required for personal working with chemical and biological Agents

No.	Country	Course provider, address	Topics covered	Target group
42	USA	University of North Carolina at Chapel Hill, Environment, Health & Safety, 212 Finley Golf Course Road, CB 1650, Chapel Hill, NC 27514	Biological Safety 2 Training covers laboratory Associated infections, biosafety level 2 facilities and practices, and effective use of biological safety cabinets.	No information available
43	USA	Case Western Reserve University, Department of Occupational and Environmental Safety, Service Building, 2220 Circle Drive, Level One, Cleveland, OH 44106-7227	All around the „Blood-borne Pathogen Standard“ (no further information available)	No information available
44	USA	University of Illinois at Urbana-Champaign, 1401 West Green Street, Urbana, IL 61801	Safe Handling of Human Cell Lines/Materials in a Research Laboratory, Occupational Exposure to Blood-borne Pathogens	Staff who work with human-origin materials, workers with reasonably anticipated exposure to human blood and other potentially infectious materials
45	USA	RESQ Services, 1138 Gainesborough Court, Henderson, Nevada 89015	Biological Safety Training: This training covers regulatory guidelines for laboratories performing biological research. Topics covered include; risk assessment, prevention of laboratory infection, signs and symptoms of exposure, and good laboratory practices and procedures.	Principal Investigators and Departments may request this training as needed. Duration is approximately one hour.

No.	Country	Course provider, address	Topics covered	Target group
46	USA	The Laboratory Safety Institute 192 Worcester Road Natick, MA 01760	1.) Biosafety In The Laboratory (jährlich) 2.) Four-Day (24-hour) Short Course (?) 3.) Laboratory Waste Management Workshop (monatl.) 4.) Laboratory Ventilation for the Research Professional (?) 5.) One-Day Lab Safety Seminar (monatl.) 6.) Safety in the Elementary Science Classroom (monatl.) Client specific courses on request	For science educators and scientists
47	USA	Eagleson Institute P.O. Box 954 Sanford, ME 04073	1.) Fundamentals of Laboratory Safety, 2.) Safety Cabinet Technology	1.) Laboratory and Facility Managers, Certifiers, Biosafety Professionals, IBC Members, Industrial Hygienists, and anyone new to the field of laboratory safety 2.) Biosafety Officers, Principal Investigators, Industrial Hygienists, Facility Engineers, Architects and Certifiers
48	USA	Centers for Disease Control and Prevention Office of Health and Safety Mailstop F05 1600 Clifton Road Atlanta, GA 30333	Web based (E-learning) Laboratory Biosecurity course	Laboratory biosafety and biosecurity officers, laboratory directors, and other laboratorians in academic, government, and commercial laboratories. Others who will benefit from this training include community, hospital, and other clinical laboratory directors, safety and security officers, and laboratorians.

In the following, supplementary information is given for selected training measures listed in Table A (No. 7, 8, 10, 11, 12, 17; marked with an asterisk)

No. 7: Hannover Medical School, Hannover, Germany - Course on risk assessment, safety measures, principles of legislation and workers´ protection

Under the German Genetic Engineering Act project leaders and biosafety officers must complete a supplementary training with emphasis on risk assessment, safety measures, principles of legislation and workers´ protection. The content is based on the curriculum of the Federal Biotechnology Authority with viral vector systems, transgenic animal models and the European Genetic Engineering Directive as additional areas of focus. This course is directed at life scientists and medical doctors who as project leaders or biosafety officers will be responsible for the conduct of genetic engineering experiments in Germany.

Topics covered:

- Safety aspects and risk assessment for dealing with bacteria in gene technology
- Safety aspects and risk assessment for dealing with viruses in gene technology
- Safety measures for designated genetic engineering areas
- Working with and potential of transgenic animal models
- Notification procedure and approval requirements, organisational steps
- Transport and shipping of biological material
- Safety aspects and risk assessment for dealing with oncogenes, cell culture, etc. in gene technology
- Genetic Engineering Law, International regulations for the application of gene technology)
- Genetic Engineering Law, "Gentechnik-Sicherheitsverordnung" and additional relevant regulations
- Utilization and endangering potentials of transgenic plants; environmental considerations in a deliberate release
- Security classification of enetic engineering projects

No. 8: Georg-August-Universität Göttingen, Institute of Virology, Germany - BSL3 training course

The aim of the course's agenda is to convey practical knowledge on safety precautions and procedures needed to run a BSL3 laboratory, including the items important in constructing (only requirements concerning biosafety precautions and running a BSL3 lab). The lectures on technical, formal and practical issues of working in BSL3 laboratories will be complemented by practical exercises featuring basic protective garments and positive pressure masks. The basic skills of virus and bacteria culture in BSL3 conditions will also be part of the

practical. All together the programme aims at training people new to BSL3 work but also addresses people that have experiences in BSL3 work but feel the need to upgrade their skills to up to date standards

Topics covered in the theoretical part:

- Hazard Criteria and Categorisation of Microbes
- BSL3 Lab Technical specifications
- Protective Gear (includes 15min movie on laminar flow cabinets)
- Efficacy of Inactivation Procedures

Topics covered in the practical part:

- Practical Moving in and out of a BSL3 (includes hand washing)
- Dexterity at the Laminar Flow Cabinet
- Mock dilution series of intensely coloured solutions in protective gear
- Inactivation of virus cell cultures test series setup
- Cultivation of B. anthracis
- BSL 4 Labs technical specifications, BSL4 Labs in Europe
- Learning from a history of lab accidents
- Shipping BSL3 and BSL4 organisms /IATA regulations UN regulations
- Handling positive pressure masks
- Dexterity at the Laminar Flow Cabinet
- Interpretation of B. anthracis read out
- Handling samples that arrive for diagnostic testing
- Bridging the gap between requirements of bio-containment and diagnostics
- Waste Management
- Fumigation (Theory and Practices)
- Inactivation of virus cell cultures test series read out
- PCR read outs

No 10: Smittskyddsinsitute, Solna, Sweden - Biosafety in microbiological laboratories

In Sweden there is also no legal basis for biosafety training. It is the employers' responsibility to meet certain standards in order to ensure safety.

The course for PhD students will provide advanced knowledge of biological safety principles and practices for working in a containment laboratory.

The course is part of a credit system for the students who have to finish it with an examination. Biosafety has to be science-based and the training policy at SMI is therefore a bottom-up approach involving scientists as teachers asking what the need to know is. In a new approach Swedish police representatives are invited to give lectures in biosecurity. The major goal is a laboratory safety education.

The course includes the following topics:

- Principles of biocontainment (including rules and regulations; containment levels and biological agents risk group classification; principles of ventilated work areas)
- History and prevalence of laboratory acquired infections
- General description of a biosafety system (including review process, guidelines and feed back mechanisms to operate the system)
- Transmission routes (natural and in a laboratory setting) of some examples of common viral risk group 3 pathogens, including blood-borne and air-borne bacterial pathogens
- Understanding the principles of risk management (identification; assessment; handling)
- Understanding of how and when to perform an advanced risk assessment (including biosafety and biosecurity)
- Basic understanding of transport and shipment of biological material
- Principles of infectious waste handling. Decontamination principles and procedures
- Extended knowledge of the use of personal protective equipment. Principles of hand hygiene procedure
- Practical and theoretical knowledge in how to manage a spill of infectious material
- Health status monitoring and principles of accident reporting
- Safety aspects in molecular biology including general criteria for environmental risk assessment of GMMs
- Principles of risk communication
- Examples of biosecurity concept and measures

No 11: Swiss BIOSAFETY curriculum - General biosafety, Risk assessment and risk management, Biotechnology

Biosafety officers with sufficient knowledge and skills and a biorisk management system are the two main components to ensure that biosafety and biosecurity are addressed and managed properly in biorisk facilities. The biosafety officer plays a pivotal role when it comes to setting up and implementing the management system including – to name just the most important elements – risk assessments, safeguards, training, and controlling its implementation and application.

In most countries the biosafety officer (or biosafety coordinator) is a regulatory requirement for all facilities dealing with biorisks. In many countries, his or her duties are laid down in the regulatory framework and basic education is provided, but a certified curriculum and the associated training programmes do not exist.

The main objective of the curriculum is to create an accreditable or certifiable biosafety education for Swiss Biosafety officers.

Fundamentals

- Microbiology
- Molecular biology and recombinant DNA
- Pathology and diagnostics of infectious diseases
- Methods in biotechnology and diagnostics

Principles of biosafety and biosecurity

- Hazards in biological labs
- Lab-associated infections
- Barrier principles
- Risk Assessment
- Occupational and environmental health and safety
- Biohazard laws, regulations, standards, and guidelines
- Facility Architecture and Engineering
- Laboratory and safety equipment
- Facility Construction and Commissioning
- Facility Operation and Maintenance
- Ergonomics
- Biosafety programme management
- Personal protection equipment
- Safe working in biohazard environments
- Human Factors

- Hygiene, disinfection, decontamination, sterilisation
- Waste handling
- Packaging, shipping and transportation of biological materials
- A biosafety officer's diary

Special topics

- Training
- Emergency preparedness and response
- Laboratory animal experiments
- Veterinary applications
- Large scale production
- Greenhouses and plant laboratories
- Biothreat management, preparedness , detection and response
- GMP
- Maximum containment applications (BSL-4)
- TSEs
- Gene transfer vectors
- Auditing for safety professionals
- Risk management

No. 12: Health Protection Agency; UK, "Principles and practices at working at ACDP containment Level 3"

This course gives the delegate a systematic review of the facility design, operational practices and safety management which contribute to working safely in the containment level 3 environment. The delegates meet experts in the field in both practical and lecture settings and time is scheduled for debates into best practice in Containment Laboratories. Practical work undertaken on this course simulates working at CL3 in a genuine CL 3 laboratory using Hazard Group 1 agents or non-toxic liquids and powders.

The course content includes:

Theory

- Infectious Diseases - Principles of Infection
- Hazard Criteria and Categorisation of Microbes
- Why Regulate
- Laboratory acquired and related infections (Historical and contemporary perspectives)
- Containment Level 3 (HSE video)
- Laboratory Biosafety criteria and rationale
- Pathogen Movements across boundaries
- Microbiological Waste Product
- Laboratory inspection and auditing: Purpose and Objectives
- Principles and Practice of Sterilisation
- Project (work) design *vs* safety considerations
- Personal Protective Equipment
- Health Factors for the Laboratory workers
- Project Design and BIG
- Disinfection Kinetics and efficacy evaluation
- Biocontainment - Purpose design and selection
- Theory and Practices of Fumigation
- Containment considerations when working with Prions

- Overview of Inspection authorities
- Safety Management - Responsibilities and Accountabilities
- Biosecurity
- Accidents and Incidents - reporting, monitoring, investigating and preventing
- Facility and equipment monitoring and evaluation

Practical sessions

- Codes of Practice
- Audit of CL3 Laboratory
- Dexterity Testing
- Laboratory Manipulations
- Laboratory Discipline
- Clinical Samples
- Accident Scenarios
- Laboratory Design
- Risk Assessment

No. 17: Bureau GGO, The Netherlands - Position and training of the biosafety officer

2-days course to comply with GMO regulations of The Netherlands, organised by the GMO office under responsibility of the Ministry of VROM. Several experienced BSOs and members of the professional organisation of BSOs: Association BVF-Platform (http://www.bvfplatform.nl/), are involved as course instructors. In The Netherlands there are approximately 300 approved BSOs and about half of them are member of BVF-Platform. The organisation in collaboration with VROM made guidance to a Handbook GMO contained use, that can easily be modified to the specific requirements of an individual user. They also made in 2003 a 19-minutes instruction movie with the title: "……. exactly as it should be ".

The course outline is as follows:

Day one:
1. GMO Decree and Ministerial Order GMO (History, background and role of Ministry of VROM as competent authority)
2. Internal organisation, procedures and administration requested from each user
3. Environmental Management Act in practice (Application for permit for premises with the required level of containment)
4. Introduction to BVF-Platform (Professional organisation of BSOs in The Netherlands)
5. Basic principles of risk analysis and assessment
6. Supervision and enforcement of GMO-legislation by VROM inspectorate
7. Workshop A: preparing the notification form based on a case example

Day two:
8. Internal organisation, procedures and administration; practical experience and the implementation of the Handbook GMO contained use at a university and a research organisation
9. Incidents, accidents and calamities with GMOs
10. Practical examples of laboratory equipment in contained areas
11. Practical examples of disinfection and inactivation
12. Legislation related to work with GMOs (Occupational health, biological agents, plant pathogens, animal pathogens, quarantine organisms, experiments with animals, transport of infectious agents and GMOs, waste)
13. Workshop B: from notification to permit. How does the GMO office translate the notification form (prepared in Workshop A) into a permit. When, why and which additional information is required
14. Amending an existing permit
15. Introduction to and presentation of the VROM/BVF-Platform movie about safe microbiological techniques and GMO legislation in The Netherlands.

For deliberate release of GMOs similar procedures apply and since May 28, 2004, based on EC Council Directive 2001/18/EC, appointment/approval of an Environmental Safety Officer is required. The ESO and BSO may be the same person.