1. Purpose

The purpose of this guideline is to establish the minimum requirements that must be met to assure students and employees are provided adequate safety and health instruction and oversight when performing learning or research activities that may expose them to a hazardous condition and to establish a review procedure by which safety in instructional activities will be achieved.

2. Scope

Virginia Tech strives to maintain a safe living, learning, and working environment. Faculty, staff, graduate teaching assistants, and other members of the Virginia Tech community must provide adequate oversight and safety and health instruction to students as needed to assure their safety and compliance with applicable federal, state, and local regulations, university policies, and Environmental Health and Safety (EHS) requirements.

3. Procedures

3.1 Educational Activities

Department Head/Chair

Department heads/chairs should review the instructional activities within their academic units to evaluate the potential safety and health exposure risks presented to students, teaching staff and other participants. The review should include consideration of the conduct of classes, including the level of supervision needed to assure adequate oversight of student activities and allied instructional activities. Attention should be given also to non-traditional activities such as

mini-courses, non-credit or optional activities associated with a course. The procedure to be followed in the review is best determined by professionals in a particular academic unit, within the following general guidelines:

1. New courses, courses under revision and allied instructional activities should be reviewed critically by departmental and college curriculum committees with regard to potential safety and health exposures before such courses or activities are instituted. The forms for all new courses (undergraduate and graduate) submitted for approval through regular curriculum channels should include a section that indicates that a safety and health review has been completed resulting in a determination of the appropriate course safety category. For all Category 2 and 3 courses, a completed Course Safety Evaluation Form should be attached.
2. Existing courses within each program, department or division should be periodically reviewed by the department head/chair, working with appropriate faculty, with regard to safety and health exposure risks. The Course Safety Evaluation Forms should be submitted to EHS for all Category 3 courses.
3. The department head/chair is expected to discuss safety and health considerations with new faculty members when they are assigned to existing courses or with experienced faculty members when they are assigned to courses which they have not previously taught.
4. The department head/chair should conduct safety and health reviews for his/her academic unit but may assign the function to an individual or a committee.
5. The department head/chair of the academic unit, the designated individual, or the chair of the responsible committee should consult with persons with special expertise when such expertise is needed and is not available within that department or division. EHS will serve as a technical resource to support these reviews.

The department head/chair or his or her designee should review all courses of that unit in accordance with the following criteria:

- **Category 1**: Courses in which students are not exposed to any hazards. (An example of this category is a course in English literature requiring only classroom instruction.)
- **Category 2**: Courses in which students are exposed to some moderate hazards but are not likely to suffer serious bodily injury or health impairment. (Examples of this category are a physical education class in which the students learn to play tennis or basketball, a freshman chemistry laboratory and a ceramics class using a kiln.)
- **Category 3**: Courses in which students are exposed to significant hazards that have the potential to cause serious bodily injury, significant illness, or death.

Examples of Category 3 activities include, but are not limited to, the following:

- Advanced science laboratories in which infectious agents or highly hazardous chemicals are used or produced;
- Work using power tools or powered machinery;
- Use of Class 3R, 3B or 4 laser systems;

- Electrical work involving potential exposure to energized systems operating at more than 50 volts AC or 75 volts DC;
- Animal handling;
- Remote location field work and research;
- Entry into confined spaces such as wells, storm sewers, etc.;
- Work where there is exposure to an unguarded fall hazard of more than 4';
- Rapelling;
- Boating and work over water;
- Construction-related activities.

Courses determined to fall in Category 1 do not require further action. The department head/chair or his or her designee should complete a Course Safety Evaluation Form for each course in Category 2 or 3. Information provided in the form should contain (1) an explanation of the hazards associated with the teaching of the course and (2) a description of measures which have been taken to reduce those hazards. The Course Safety Evaluation Form should be maintained in the departmental files and updated every five years, when any significant change in course structure or potential hazard exposure is anticipated, or if any accident or injury occurs that indicates safety or health precautions were not adequate.

Faculty, Teaching Assistants, Supervisors and Support Staff

All university administrators, faculty and staff are expected to be continuously and actively concerned about safety and health exposures in the teaching environment. The university Health and Safety Policy mandates compliance with federal and state laws, Environmental Health and Safety programs, and other applicable university policies and programs. It is the responsibility of those directly involved in academic instruction to critically evaluate specific courses and the immediate environment in which instruction occurs. Faculty, teaching assistants, supervisors and support staff must:

1. Comply with the university's Health and Safety Policy and implement all applicable university safety and health programs in work areas under their supervision/control.
2. Maintain workplaces and equipment under their control in a safe, well-kept condition by performing inspections at regular intervals. Ensure compliance with the Health and Safety Policy and EHS requirements in these workplaces. Documentation of these inspections shall be maintained at the departmental level for review by EHS. For guidance, see www.ehss.vt.edu.
3. Assure identified hazards are addressed by implementing engineering or administrative controls, enforcing the use of necessary personal protective equipment (PPE), removing non-compliant or hazardous machinery or equipment from service, or eliminating the hazard. Employees and students must be trained on these controls and procedures; such training shall be documented in writing. Where respirators will need to be worn, training and medical clearance must be arranged with EHS by the responsible authority in advance of the activity.

4. Take all reasonable steps to reduce hazard exposure. Such steps could include, for example, replacing use of an infectious agent with a noninfectious agent, or using chemicals of a lower hazard class.
5. Consult with EHS on the proper disposal of chemical, radiological, nanomaterials, biological waste, regulated medical waste and mixed hazardous waste.
6. Provide safety instruction in the course syllabus, and fully explain applicable safety and health considerations to students at the beginning of each term and reiterate such considerations as appropriate throughout each term.
    a. Demonstrate safety procedures, including the use of PPE and engineering controls (such as fume hoods), and discuss potential hazard exposures and their controls with students before they begin their work. If applicable, explain the use of safety showers, safety eyewashes or other emergency response equipment.
    b. Fully explain the risk of zoonotic, infectious agent and biological exposures, if applicable, and the potential health risks associated with such exposures.
7. Post safety instructions on the laboratory or workshop wall visible to all who enter, and post required warning signs at the entrance into each laboratory, workshop, or other area containing special hazards.
8. Determine and provide staffing sufficient to assure adequate oversight and supervision of the teaching or research activity. Students should not be allowed to work unsupervised except as expressly permitted by the authority having oversight of the activity.
9. Ensure that all accidents and near accidents are investigated and reported, and action is taken to prevent a recurrence. Accidents involving students are to be reported to EHS using the form found at www.ehss.vt.edu. Accidents involving employees are to be reported to Human Resources using the Employers' Accident Report in accordance with Policy 4415, Workers' Compensation.
10. Ensure medical treatment is received for all injuries. Where the work activity poses a high potential for injury (for example, in machine shops), assure that at least one person trained in first aid is immediately available to respond.
11. Obtain, as applicable, approval from the Institutional Animal Care and Use Committee, Institutional Biosafety Committee, Institutional Review Board, Radiation Safety Committee, or EHS Laser Safety Officer prior to performing any instructional activity for which an approved protocol is required.
12. Attend any required regulatory training offered by EHS applicable to the class or research activity. For more information, see www.ehss.vt.edu/training.
13. Fully cooperate with EHS when inspections or investigations are performed.
14. Do not allow any operation to be performed or equipment to be used that presents an exposure that is immediately dangerous to life or health.

Students

Students are required to:

1. Avoid, eliminate or minimize hazards of which they are aware;
2. Comply with all health and safety instructions and protocols;
3. Attend any required safety training;

4. Properly use all safety devices and PPE;
5. Wear proper attire as required for access to the class or activity;
6. Not willfully place at risk the health and safety of themselves or any other person;
7. Seek information or advice where necessary, or when in doubt, before carrying out new or unfamiliar work;
8. Be familiar with emergency and evacuation procedures;
9. Report all accidents and near accidents to the course instructor.

Environmental Health and Safety

Environmental Health and Safety will:

1. Receive, review and provide guidance on any Category 3 instructional activity;
2. Provide mandated health and safety training for employees where required based on hazard exposures or work performed;
3. Support departmental efforts to develop and provide safety instruction as a part of classroom instruction as applicable;
4. Monitor and inspect teaching and research activities to assure compliance with this policy;
5. Serve as a technical resource to the university community on the evaluation and control of hazards in research and teaching venues.
6. Coordinate the disposal of chemical, biological, nanomaterial, radiological, regulated medical waste and mixed hazardous waste.
7. Order the cessation of any work process or activity that exposes any person to a condition which is immediately dangerous to life or health.

3.2 Research Activities

Laboratory supervisors/managers and Principal Investigators are directly responsible for the safety and health of their workers and students. You may delegate specific tasks, but you cannot delegate your supervisory responsibilities for safety. Your safety responsibilities include, but are not limited to:

1. Assuring all required standard operating procedures, to include laboratory-specific documentation, are developed in advance of the work being performed. These SOPs and the laboratory-specific documentation are to be periodically reviewed and when any change in material, process or equipment is anticipated. For more information, see www.ehss.vt.edu or contact EHS at 231-3600.
2. Performing a preliminary risk assessment to assure any hazards created by the research are reduced to a safe level through the use of engineering or administrative controls or personal protective equipment (PPE). Where a reasonable level of safety cannot be achieved, consult with EHS on alternative means for assuring employee and student safety.
3. Training all employees and students on the hazards present in the workplace, safe work practices, any machine-specific work practices, and emergency procedures. Persons shall be trained at the time of initial assignment, when procedures are changed, and

when new hazards are introduced. Training records shall be maintained within the work area for review by EHS or may be maintained in the EHS Safety Management System. Certain work tasks, as detailed in Appendix A, require additional training.

4. Assuring proper chemical use, storage and labeling, and providing lab workers access to all relevant Safety Data Sheets.
5. Submitting, at least annually or when any significant deviations to chemical quantities are anticipated, a chemical registration to EHS. Chemical information may be entered at www.ehss.vt.edu (click on Safety Management System).
6. Evaluating the work area and work processes to identify any needed PPE. Document this hazard assessment, and provide and assure all needed PPE is used as required.
7. Obtaining all needed authorizations and approvals in advance of work with: radioactive materials or radiation-producing equipment; select agents and toxins; human subjects; Class 3B, 3R or 4 lasers; Nanomaterials; recombinant DNA; human or primate fluids/tissues; animals; infectious agents; and respirators. Such approvals shall be obtained, when required, from the Radiation Safety Committee, Institutional Biosafety Committee, Institutional Animal Care and Use Committee, Institutional Review Board, and Environmental Health and Safety.
8. Assuring employees receive any required medical surveillance services. For more information, see http://www.ehss.vt.edu/programs/OHA_program_online.php. Where respirators will be used by employees or students, consult with EHS prior to purchasing or using this PPE. Where students who are not volunteers or paid employees will be exposed to health hazards for which medical surveillance and/or prophylactic services are warranted, consult with EHS in advance of performing such activities.
9. Assuring all required laboratory signage or warning signs are posted and maintained, and that emergency contacts, to include secondary contacts, are established for all research operations.
10. Reporting all accidents and injuries. Employee injures shall be reported using the Employer's Accident Report, http://www.hr.vt.edu/benefits/workerscomp/index.html. Student injuries shall be reported using the form found at www.ehss.vt.edu.
11. Performing a safety inspection of the work area at least twice a year. Documentation of such inspections should be maintained within the work area for review by EHS. For further guidance, see http://www.ehss.vt.edu/detail_pages/document_list.php?s_document_title=checklist
12. Disposing of chemical, radioactive and biological waste properly. For more information, see http://www.ehss.vt.edu/programs/waste_chemical.php.

4. Definitions

Immediately Dangerous to Life or Health means: an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere; and, any physical hazard that poses an

immediate risk of severe injury or death including, but not limited to, electrical exposures, fall hazards, and unguarded machine hazards.

Highly Hazardous Chemicals include, but are not limited to, those which are "select carcinogens," reproductive toxins, substances which have a high degree of acute toxicity, pyrophoric, explosive, Class 3 or 4 Oxidizers, Class 3 or 4 Unstable Materials, Class 3 Reactive Materials, or that are otherwise immediately dangerous to life or health upon exposure.

Remote Field Research means approved practical work carried out by staff, students or volunteers for the purposes of teaching and/or research in locations where communications and/or access to emergency medical services are restricted or unavailable and where the university is responsible for the safety of staff, students and volunteers exposed by the activity. Examples include field excursions, field campus, archeological digs, wildlife trapping, surveying, etc. Voluntary and leisure activities not forming part of a defined and approved curriculum or research project are excluded.

Safety, as used in this policy, covers hazards that present a risk of physical injury as well as those which present a risk of illness or impairment of health of the individual.

5. References

Policy 1005, Health and Safety Policy (http://www.policies.vt.edu/1005.pdf)

Guidelines on Minors in the Workplace, Revision 1.1

Virginia Tech Animal Research Policy (http://www.policies.vt.edu/animalresearch.php)

Virginia Tech Human Subjects Research Policy (http://www.policies.vt.edu/HumanSubjectsPolicy.pdf)

Institutional Biosafety Committee (http://ibc.researchcompliance.vt.edu/)

Radiation Safety (http://www.ehss.vt.edu/programs/radiation_safety.php)

Policy 4415, Workers' Compensation (http://www.policies.vt.edu/4415.pdf)

VirginiaTech

Course Safety Evaluation Form

For Categories 2 & 3 only

Instructions: Please review all courses in the official inventory of your unit using the *Safety and Health Guidelines for Educational and Research Activities* as your guide. List below the official department number and title of each course which is determined to be in Category 2 or Category 3. For each course listed, provide (1) an explanation of the hazards associated with the teaching of the course, and (2) a description of measures which have been taken to reduce those hazards. If the hazard controls that will be employed for a Category 3 course do not reduce the hazards to Category 2 or below, it is recommended that Environmental Health and Safety be consulted (231-3600 or email safety @vt.edu).

Note: This form must be updated every five years.

College/School:	
Department/Division:	
Semester/Year:	
Course Number:	
Course Title:	

Check one: ☐ **Category 2 (Retain in department)** ☐ **Category 3 (Submit to EHS)**

Explanation/Description of the Hazard(s)

Description of the Hazard Controls that will be Used

Do these controls reduce the hazard(s) to Category 2 or below? ☐ **Yes** ☐ **No**

Review conducted by:		**Date:**	
Department Head or Chair:		**Date:**	
Other Reviewers:		**Date:**	

Appendix A: Additional Training Requirements

The following trainings are required if the person is performing work using the indicated equipment or is performing the identified task. Training for these program areas is provided by EHS by registering at http://www.ehss.vt.edu/training/.

Aerial Lift Training	Certification is mandatory for employees who use aerial lifts or manlifts. Training must be completed prior to EHS observation on the particular type of lift you will be operating - scissor, telescoping, articulating, or boom truck. Operators must be observed safely operating the lift before certification is completed. Refresher training required every 3 years.
Bloodborne Pathogens	Training is mandatory for persons potentially exposed to human blood, body fluids, or cell lines during the normal course of their work activities (e.g. plumbers, custodians, all medical and some laboratory personnel).
Compressed Gas Cylinder Safety	Training is recommended for persons who handle, store, and use compressed gas cylinders. Note: Persons that work with compressed gases outside of a chemical research laboratory must also have Hazard Communication training. Refresher training is required every 5 years.
Confined Space Awareness	Training is mandatory for persons that work around, but who do not enter, confined spaces. Refresher training is required every 5 years.
Confined Space Entrant/Attendant/ Supervisor	Training is mandatory for persons that enter confined spaces or serve as an attendant. Supervisors of entrants or attendants must also attend this training. Class length is 3 hours. Refresher training required every 3 years.
Dry Ice Shipping	Training is mandatory for anyone shipping materials by air that are packed with dry ice. Refresher training is required every 2 years.
Electrical Awareness	Training is mandatory for persons that work around, but not on, exposed energized conductors. Refresher training is required every 5 years.
Electrical Qualified Person	Training is mandatory for persons that work on energized electrical systems operating at 50 volts or more to ground. Class length is 3 hours. Refresher training is required every 3 years.
Excavation Awareness	Training is mandatory for persons that work around, but who do not enter, excavations greater than four feet deep. Refresher training is required every 5 years.
Excavation Competent Person	Training is mandatory for supervisors and designated competent persons who oversee excavation operations. Class length is 3 hours. Refresher training required every 3 years.
Fall Hazard Awareness	Training is mandatory for persons that work around potential fall hazards greater than four feet. It is available online. Refresher training is required every 5 years.
Fall Protection User	Training is mandatory for persons that are exposed to fall hazards greater than four feet where a personal fall arrest system must be used, including ladder safety devices and aerial lifts. Class length is 3 hours. Refresher training required every 3 years.

Farm Safety	Training is mandatory for persons that operate farm machinery, especially tractors, which incorporate power take-offs, exposed moving parts, or equipment related hazards. Refresher training required annually.
Fire Prevention Planning	Departments that store or use flammable and combustible liquids (outside of a research laboratory) must develop a Fire Prevention Plan. It is available online. Refresher training is not required.
First Aid/CPR/AED-Adult	Training is mandatory for shop supervisors, persons who work in remote locations (ex. farms), on energized electrical systems, in confined spaces, or that perform telecommunications cabling. Class length is 6 hours. Refresher training required every 2 years.
Flammable Liquid Safety	Training is recommended for persons who handle, store, and use flammable liquids. Note: Persons that work with flammable liquids outside of a chemical research laboratory must also have HAZCOM RTK (Hazard Communication Right-to-Know) training. Refresher training is required every 5 years.
General Laboratory Safety	All employees in a research laboratory are required to review the Chemical Hygiene Plan including the "Laboratory Specific Documentation" (formerly referred to as Part B) for their laboratory, and be trained on the specific hazards of their work environment. This mandatory training is to be performed by the Principal Investigator or their designee. EHS offers general, non-mandatory training on safety issues in the research environment. At the time any employee is introduced to new hazards or new protocols in the laboratory, they must receive safety and operational training. Refresher training is required every 4 years.
Hazard Communication, Right-to-Know	Training is mandatory for personnel who use hazardous chemicals in a non-laboratory setting. Refresher training is required every 5 years.
Hearing Conservation	Training is mandatory for persons that use hearing protection due to a potential or existing excessive noise exposure. Training is included with annual hearing tests. Refresher training required annually.
Hot Work Permit Coordinator	Training is mandatory for supervisors of departments that perform welding, cutting, brazing, torch cutting, and similar open-flame operations. It is available online. Refresher training is required every 5 years.
Infection Control	Training is recommended for persons who work with wild animals during field work, specifically wild mice, migratory birds, or when working in remote locations. Class length is 2 hours. Refresher training is not required. Employees or volunteers who handle animals, who perform research in the field, or who work with infectious organisms are required to participate in the medical surveillance program through which you will be offered vaccinations and other services appropriate for your work-related exposure, if any.
Introduction to Biological Safety Cabinets	Training is mandatory for laboratory personnel who need to use biological safety cabinets to manipulate biohazardous agents/materials. Refresher training is not required.

Lab Safety: Hazardous Waste Management	Training in proper collection, handling, and disposal of laboratory biowaste, chemical, glass, sharps wastes etc. is recommended for all laboratory personnel, laboratory supervisors, and Principle Investigators conducting research. It is available upon request. Refresher training in not required.
Laser Safety	Training is mandatory for persons that use class 3b or 4 lasers. All users must also take an eye exam. Class length is 1 hour. Refresher training is not required.
Lead Awareness	Training is mandatory for persons that perform maintenance or renovation work, or who work with lead materials in the course of their duties. Class length is 1 hour. Refresher training required annually.
Lockout-Tagout Authorized Person	Training is mandatory for persons that service/maintain/repair systems with hazardous energy sources, such as electrical, mechanical, steam, hydraulic, pneumatic, etc. Class length is 2 hours. Refresher training is required every 3 years.
Machine Shop Coordinator	Departments with machine shops, woodworking shops, metalworking shops, or similar operations must designate a Machine Shop Coordinator. Training is mandatory for designated departmental machine shop coordinator. Class length is 2 hours. Refresher training is required every 5 years.
Mobile Crane Safety	Persons in the vicinity of mobile cranes, such as on construction sites or similar projects, must attend awareness level training. Refresher training is required every 5 years.
MS4 Stormwater Training	Municipal Separate Storm Sewer System training is required for personnel who may adversely affect Virginia Tech's stormwater runoff into local waterways. Refresher training is required every 2 years.
Overhead Crane Training	Training and operator certification is mandatory for persons that use overhead cranes. Refresher training is required every 3 years.
Personal Protective Equipment (PPE) Awareness	Training is required for persons who must wear PPE, where engineering or administrative controls have not reduced the risk to an acceptable level. Separate training is required for users of personal fall arrest systems and flame-resistant (i.e. rated) clothing. Refresher training is required every 5 years.
Personal Protective Equipment (PPE) Coordinator	Departments (other than chemical research laboratories) that use PPE (e.g. safety glasses, hard hats, gloves, etc.) must designate a PPE Coordinator and implement a hazard evaluation program. Training is mandatory for the PPE Coordinator. The PPE Coordinator is responsible for informing departmental personnel of program requirements. Class length is 2 hours. Refresher training is required every 5 years.
Portable Fire Extinguishers	Training is mandatory for persons that are expected to use fire extinguishers, such as those performing welding/cutting (i.e. hot work) operations, those serving as fire watches, personnel with crowd management duties, residential house/area managers, and housekeeping supervisors. Refresher training is required every 2 years.

Powered Industrial Truck Training	Training is mandatory for persons that use forklifts, powered pallet jacks, order pickers, and similar equipment. Operators must also be observed by EHS prior to using such equipment to complete certification. Refresher training required every 3 years.
Radiation Safety	Training is mandatory for all users of radiation sources and radioisotopes. Class length is 2 hours. Refresher training required annually.
Respiratory Protection	Training is mandatory for persons who must wear respirators to control exposure to a chemical, particulate, or other respiratory hazard. Training is conducted in conjunction with fit-testing. Class length is 1 hour. Refresher training required annually.
Reverse Signal Operation Safety	Persons on construction sites, or operating vehicles and heavy equipment where an obstructed view to the rear is possible, must attend this training. Refresher training is required every 5 years.
Safe Autoclave Use and Verification	Training is mandatory for personnel who use autoclaves for sterilization/ decontamination of research materials, equipment, etc. Refresher training is not required.
Scaffold Awareness	Training is mandatory for all persons who work on, or access, scaffolding. Refresher training is required every 5 years.
Scaffolding Competent Person	Departments that use scaffolding must designate a competent person to oversee erection, moving, altering, and dismantlement operatons. Training is mandatory for the designated departmental scaffold competent person. Class length is 4 hours. Refresher training required every 3 years.
Select Agents	Training is mandatory for persons using select biological agents as listed by the CDC/APHIS. Class length is 2 hours. Refresher training required annually.
VDOT Flagger Certification	Training and certification is mandatory for all persons who perform flagging operations on roadways. Class length is 1 hour. Refresher training required every 2 years.
X-ray Safety	Training is mandatory for persons working with x-ray producing equipment. Class length is 1 hour. Refresher training is not required.