	NEW JERSEY INSTITUTE OF TECHNOLOGY University Heights, Newark, New Jersey 07102
NJIT New Jersey's Science & Technology University	**Document Control No.:**
	Document Title: Personal Protective Equipment (PPE) Program

1.0 PURPOSE and SCOPE

The New Jersey Institute of Technology (NJIT) is committed to providing a safe working environment for all employees, students, and visitors. To the extent possible and feasible, NJIT will remove or eliminate hazards or exposures via engineering means. Personal protective equipment (PPE) is used to create a protective barrier between a worker and hazards in the workplace when engineering and administrative are not practical or do not offer sufficient protection. Therefore, New Jersey Public Employees Occupational Safety and Health (PEOSH) requires the use of personal protective equipment (PPE) to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. In the event engineering means cannot be implemented and/or added protection is warranted, personal protective equipment (PPE) will be provided to help mitigate the hazards inherent to particular tasks or lab environments. The purpose of this document is to:

- Review PPE requirements,
- Establish responsibilities,
- Outline methods for assessing hazards and selecting PPE, and
- Provide information on the proper use and maintenance of PPE.

The NJ Department of Labor and Workforce Development (DOLWD) and the New Jersey Department of Health (NJDOH) share jurisdiction for enforcing the PPE Standard. They adopted the federal Occupational Safety and Health Administration (OSHA) PPE regulations in 1996, and the 2008 revision that requires New Jersey public employers to pay for the PPE necessary for compliance. This program covers the following PPE:

- General Requirements *(29 CFR 1910.132)*
- Eye and Face Protection *(29 CFR 1910.133)*
- Head Protection *(29 CFR 1910.135)*
- Foot Protection *(29 CFR 1910.136)*
- Electrical Protective Equipment *(29 CFR 1910.137)*
- Hand Protection *(29 CFR 1910.138)*

NOTE: PPE requirements for other potential hazards are covered by individual programs. Please contact the EHS Department for additional information.

2.0 Abbreviation and Definitions

"Affected" person(s) - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

ANSI - American National Standard Institute is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

ASTM - American Society for Testing and Materials, is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

"Authorized" person(s) - A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Decibels - a unit used to measure the intensity of a sound or loudness

DEHS – Director of Environmental Health and Safety

DOLWD – Department of Labor and Workforce Development / Division of Public Safety and Occupational Safety and Health enforces laws and regulations that provide for safe and healthful working conditions throughout New Jersey's public and private sector.

Donning – Putting on (an item of clothing or personal protective equipment)

EHS – Environmental Health and Safety

Energized - Connected to an energy source or containing residual or stored energy.

Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Fall Protection – Systems and devices used to provide protection from falling or to safely halt an individual's fall if one occurs.

Lock Out – The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

NIOSH - National Institute for Occupational Safety and Health is the United States federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness.

OSHA - Occupational Safety and Health Administration assures safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.

PEOSH - Public Employees Occupational Safety and Health develops and enforces occupational health standards for public employees, and encourages employers and employees to improve their working environment.

PPE – Personal Protective Equipment is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection.

SCBA - Self-contained breathing apparatus is a device worn by rescue workers, firefighters, and others to provide breathable air in an immediately dangerous to life or health atmosphere.

SDS - Safety data sheet, formerly material safety data sheet, is a document that lists information relating to occupational safety and health for the use of various substances and products.

Tag Out – The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

UV – Ultraviolet radiation designates a band of the electromagnetic spectrum with wavelength from 10 nm to 400 nm, shorter than that of visible light but longer than X-rays. Eye protection and clothing must be worn to the cover the skin to prevent photokeratitis and serious sunburn.

3.0 RESPONSIBILITIES

The responsibility for safe operations within NJIT facilities and the safety of personnel proceeds from the individual and his/her supervisor, to department heads, to the Director of Environmental Health and Safety, and ultimately, to NJIT's University Leadership.

3.1 **Employees and Staff** are responsible for participating in department education and training programs; using and maintaining the required PPE; and reporting occupational hazards that could result in injury or illness.

3.2 **Department Supervisors** are responsible for conducting the initial hazard analysis with assistance, as needed, from the Department of Environmental Health and Safety for each position in the department and non-routine tasks. The hazard analysis assists in eliminating hazards through appropriate engineering controls; identifying appropriate PPE for the existing hazards; establishing an appropriate PPE maintenance program; and educating / training those working in the department or conducting non-routine tasks.

3.3 **Principle Investigators and Faculty** are responsible for conducting the initial hazard analysis for each new project; eliminating hazards through appropriate engineering controls; identifying appropriate PPE for the hazards presented; establishing an appropriate PPE maintenance program; documenting the education/training of staff and students working on the project; and maintaining a current SDS File/Binder for each project.

3.4 **Department Heads** are responsible for providing adequate facilities, equipment, instruments, supervision, and instructions to control health and safety hazards and comply with applicable state and federal requirements.

3.5 **Environmental Health and Safety Department** (EHS) has the following responsibilities in assisting the department with identifying and controlling hazards that require PPE.

A. Assisting principle investigators, faculty, and/or department supervisors, as needed, to conduct hazard assessments; establish engineering controls; select appropriate PPE; and maintain health and safety programs and documents related to the staff training/education for routine and non-routine work activities.

B. Assessing the availability of effective engineering controls that may eliminate or reduce the need for donning PPE.

C. Provide training in the use and maintenance of required PPE.

D. Performing periodic assessments for compliance with this program, and providing feedback to the department head and University Leadership.

E. Retaining a central file for staff education and training in the department.

3.6 **Director of Environmental Health and Safety** (DEHS) assures an active Personal Protective

Equipment program has been established in each department; participates in the hazard analysis as requested by EHS staff; periodically reviews the thoroughness of hazard analyses and active use of PPE by employees, students, and visitors throughout the university. The DEHS also annually reviews the overall PPE compliance initiative through each department submitting a summary report to each PI/faculty, department supervisor, department head, and University Leadership.

4.0 Hazard Analysis

For each occupational position in each department and for each research project, an initial assessment of the materials and work methods will be conducted for the purpose of identifying the workers' or students' potential exposure to hazards. Most hazards are task specific and the area where they are performed is subject to change with short notice. A hazard analysis will:

- Be conducted separately for non-routine tasks prior to the initiation of any work.
- Review the potential for injury to various parts of the body including inhalation, ingestion, and absorption.
    A. Head
    B. Face and eyes
    C. Hands
    D. Feet
    E. Respiration
    F. Hearing
    G. Other body part
- Be reviewed and updated yearly by EHS for specific tasks and experimental areas, or if warranted by routine observation.
- Be kept on file, in the respective laboratory or workspace, in an area accessible to employees and staff of the department with a copy of each retained by EHS.
- Be added for new tasks as soon as practical after the confirmation to conduct new work activities or discovery of new work activities are being performed.

5.0 Work Activity Review

The Director of Environmental Health and Safety will review this program annually with assistance as required from EHS consultant. Feedback will be offered to each department head and DEHS. A report summarizing the review will be submitted to the University Leadership.

5.1 Electrical Work

Individuals working on or near energized or de-energized electrical sources have the potential for electrocution or electric shock due to unsafe work practices, faulty equipment, and damaged connectors/receptacles to name a few. Therefore, it is an NJIT policy that circuits and equipment must be disconnected from all electric energy sources before work on them begins. In addition, "affected" persons shall receive training on safe procedures for de-energizing and reenergizing circuits and

equipment including how to properly lock out and tag out parts of an electrical system to prevent unexpected energization.

- Work on energized electrical systems is actively discouraged at NJIT. Where practical, projects requiring work on energized electrical systems should be contracted out to an "authorized" tradesman that maintains an effective electrical safety effort.
- Working in areas where it is possible to contact exposed electrical components requires the use of hard hats (Class B) and safety shoes which are specifically designed for high voltage resistance. Specific tasks that have been identified as potentially exposing personnel to electrical flash hazards require additional fire retardant clothing.

5.2 Hazardous Chemical/Solvent Use

Hazardous chemicals can present various physical and/or health hazards to individuals not limited to fire, bodily burns, cancer, and oxygen-deficient environments. Therefore, the PPE provided and donned should be comparable to the PPE recommended in the SDS by the manufacturer. At minimum, gloves should be worn when handling hazardous chemicals.

- Gloves are required to establish a barrier between the hands and the chemical.
- Eye protection shall be worn when work cannot be conducted in a chemical fume hood, and there is a potential for splash or aerosol generation.
- Lab coat should be to protect clothing and exposed skin.
- If work outside of a chemical fume hood, respirators may be required.

In some cases, such as a spill with dangerous levels of hazardous vapors, use of Self Contained Breathing Apparatus (SCBA) is required. Appropriate footwear is required. Safety glasses, face shield, or goggles are required. This equipment is specified in the Hazard Analysis for each task.

5.3 Lasers

Operation of Class III and IV lasers within the nominal hazard zone requires use of appropriate eyewear as designated by the Radiation Safety Officer.

5.4 Machine Tool Use

Safety glasses are required for all machine tool use including portable equipment. Safety shoes are required. Use of the diamond cutting wheel requires a full face shield.

5.5 Machining of Hazardous Materials

Cutting, grinding, or sanding of materials without effective local drop ventilation requires the use of a respirator with canisters appropriate for the dust being generated including

wood. The appropriate type of protection is stated in the SDS for the respective materials.

5.6 Work in Noisy Environments

Hearing protection, as specified by EHS, is required for work where noise levels exceeding 85 decibels averaged over an 8 hour day. Personnel routinely exposed to excess noise must be enrolled in the hearing conservation program and will be provided with appropriate hearing protection. There are no known areas with high noise levels on NJIT campus. However, department heads, supervisors, and EHS should be alert for newly created noise hazard.

5.7 Radioactive Material Use

Work with unsealed radioactive material that could have removable radioactivity requires the use of lab coats and gloves. The Radiation Safety Officer will specify personal protection equipment.

5.8 Work at Elevated Heights

Falls are among the most common causes of serious work-related injuries and deaths. Fall protection is required as appropriate to the job. Fall protection systems can be guardrails and toe-boards, safety net systems, personal fall arrest systems, or a combination of systems.

A. 4 Feet or Higher (General Industry)

Work at this height requires a guardrail and toe-board around every open-sided platform, floor, or runway that is 4 feet or higher off the ground or next level. Regardless of height, if a worker can fall into or onto dangerous machines or equipment, guardrails and toe-boards must be provided.

B. 6 Feet or Higher (Construction Industry)

Work at heights of 6 feet or greater above the lower level requires the use of fall protection for construction workers. It applies at heights of less than 6 feet when working near dangerous equipment, for example, working over machinery with open drive belts, pulleys or gears, or open vats of degreasing agents or acid.

5.9 Welding, Cutting, and Brazing

Health hazards from welding, cutting, and brazing operations include exposures to metal fumes and to ultraviolet (UV) radiation. Safety hazards from these operations include burns, eye damage, electrical shock, cuts, and crushed toes and fingers. Use of welding mask, gloves, aprons, and respiratory protection appropriate to the task is required.

5.10 Other

Any project or task that is deemed to require Self-Contained Breathing Apparatus must be reported directly to the Director of Environmental Health and Safety. Projects of this nature are highly discouraged.

6.0 Personal Protective Equipment Requirements

6.1 Head Protection – Hard hats must meet the specifications of ANSI Z89.1 (2009), comply with OSHA 29 CFR 1910.135, and be appropriate to the task**.** Class C hard hats are prohibited. The three classes are based on the level of protection they provide from electrical hazards.

- Class G (General) hard hats are rated for 2,200 volts (equivalent to the old Class A). Good impact protection, but limited voltage protection.
- Class E (Electrical) hard hats are rated for 20,000 volts (equivalent to the old Class B). Protect against falling objects, high-voltage shock/burns.
- Class C (Conductive) Designed for comfort, offer limited protection. Protects heads that may bump against fixed objects, but do not protect against falling objects or electrical shock.

6.2 Foot Protection - Foot injuries may occur in areas where there are rolling or falling objects, objects piercing the sole, or where feet are exposed to electrical hazards. Safety shoes must carry a stamp on the inside that indicates that they meet the specifications provided by ANSI Z41.1-1967. They must comply with OSHA 29 CFR 1910.136, and be appropriate to the task. Safety shoes worn in areas where it is possible to contact live electrical components must be appropriate for high voltage work.

6.3 Protective Eyewear must meet the specifications of ANSI Z87.1 (2010), comply with OSHA 29 CFR 1910.133, and be appropriate to the task.

A. Safety glasses, as a minimum, are required where there is a potential of eyes being struck by projectile objects. Side shields are required if there is a hazard from flying objects from the side.
B. Direct vented goggles (those with perforated holes on the sides) are an acceptable substitute for safety glasses with side shields.
C. Chemical splash goggles (those with indirect ventilation on sides) are required where protection is needed against chemical splashes or sprays. These may also be used where impact protection is required.
D. Face shields are required where facial skin protection is needed. They can only be used in conjunction with eye protection. The face shield is not a substitute for the safety glasses or goggles.
E. Shaded eye/face protection is required for radiant energy sources from arc and gas welding, soldering and brazing, laser, ultraviolet, and infrared.

6.4 Respiratory Protection must meet specifications of NIOSH 42 CFR part 84, and comply with OSHA 29 CFR 1910.134, and be appropriate to the task. For more information see Respiratory Protection Program.

6.5 **Electrical Protective Equipment** must meet the specifications of ASTM D120-09, ASTM F496-08, and ASTM D1051-08, comply with OSHA 29 CFR 1910.137, and be appropriate to the task.

6.6 **Hand Protection** must comply with OSHA 29 CFR 1910.138, and be appropriate to the task.

- Gloves must be worn when there is the potential for injury or exposure to skin contact from chemicals, infectious agents, heat, cold, abrasive, and cutting objects.
- Gloves can be used safety when the use and characteristics of the gloves are known such as thickness, permeation rate, materials being used, and length of usage.
- Ansell Edmont Chemical Resistance Glove Chart: https://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf
- VWR North Hand Protection Chemical Resistance Guide: https://eta-safety.lbl.gov/sites/all/files/VWR%20Chemical%20Resistance%20Gloves%20Chart.pdf

6.7 **Fall Protection** must comply with OSHA 29 CFR 1910.140 (General Industry) or OSHA 29 CFR 1926.502 (Construction), and be appropriate to the task.

- Restraint systems - Prevent workers from falling by keeping them from reaching an area where the fall hazard exists
- Arrest systems – Establish/Identify primary support structure that can sustain a fall and suspend an individual until rescue.

6.8 **Hearing Protection** devices reduce the noise energy reaching and causing damage to the inner ear.

- Ear Muffs - Sound-attenuating material and soft ear cushions with hard outer cups that fit around the ear.
- Earplugs - Inserted into the ear canal. They may be pre-molded or moldable (foam).

7.0 Training

Each employee who is required to use PPE will be trained in the following:

- When PPE is necessary
- What kind is necessary
- How to properly don, doff, adjust, and wear PPE
- PPE Limitations
- Proper care, maintenance, storage, useful life, and disposal of PPE

The training will include an opportunity for employees to handle the PPE and demonstrate that they understand the training and have the ability to use the PPE properly. The training will be provided by the Faculty, Principal Investigator, or supervisor of the affected workers. The training will be

documented on Part 3 of Hazard Assessment Form – Personal Protective Equipment (PPE) For Workers.

8.0 References

A. The University Of Iowa-Environmental Health and Safety - Personal Protective Equipment Program: https://ehs.research.uiowa.edu/sites/ehs.research.uiowa.edu/files/PersonalProtectiveEquipmentProgram.pdf

B. Occupational Safety and Health Administration:
   - Standards: https://www.osha.gov/SLTC/personalprotectiveequipment/standards.html
   - Fact Sheet: https://www.osha.gov/OshDoc/data_General_Facts/ppe-factsheet.pdf

C. Public Employees Occupational Safety and Health: https://www.nj.gov/health/workplacehealthandsafety/peosh/peosh-health-standards/ppe.shtml