HEALTH AND SAFETY MANUAL FOR ELECTRICAL POWER AND CONTROL ENGINEERING PROGRAM

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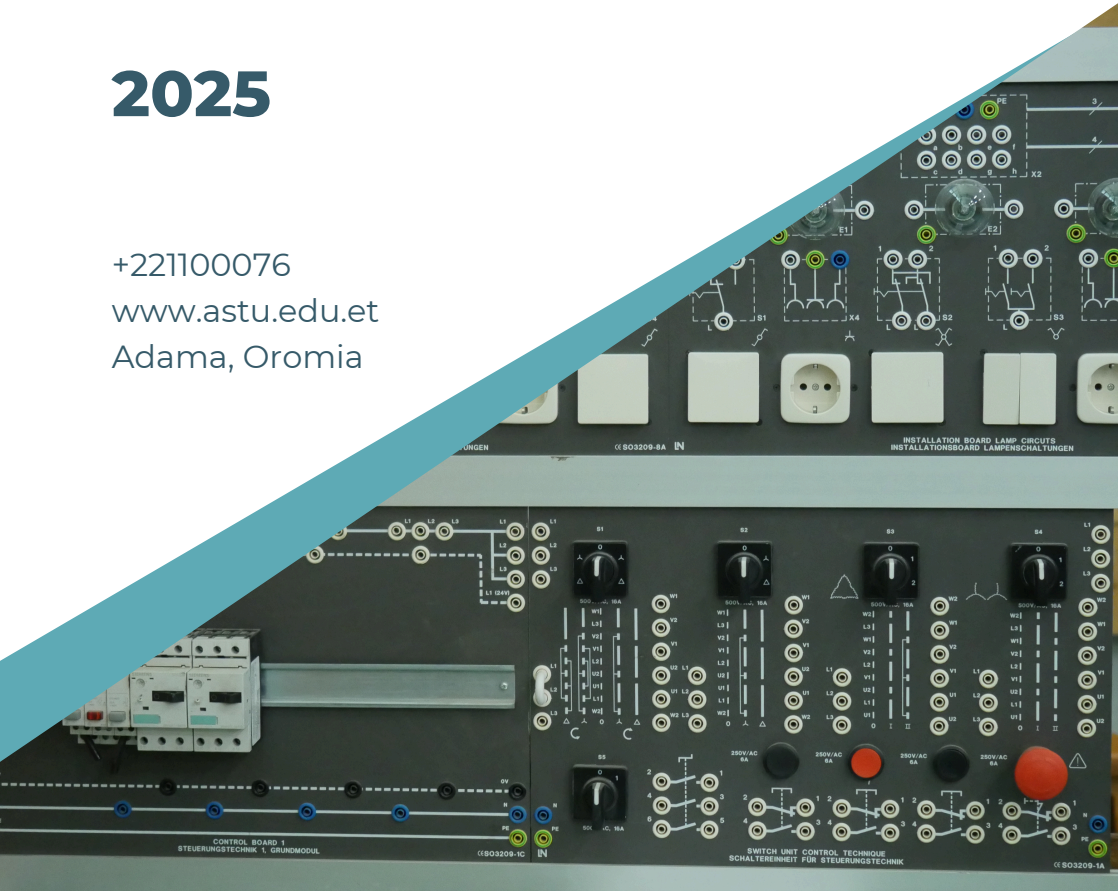

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1. Introduction

This manual provides a comprehensive guide to health and safety practices specifically tailored for the Electrical Power and Control Engineering (EPCE) program at Adama Science and Technology University (ASTU). Its primary objective is to cultivate and maintain a safe learning and working environment for all students, academic staff, researchers, and visitors engaged in EPCE activities. The manual encompasses safety protocols for diverse environments, including dedicated EPCE laboratories, workshops, field activities, and mandatory industrial internships. It aims to prevent accidents, minimize risks, and establish clear procedures for emergency response.

This document meticulously integrates ASTU's existing legislative framework, particularly the Senate Legislation and the EPCE Undergraduate Curriculum, with internationally recognized best practices in electrical safety.

1.1 Importance of Health and Safety

Electrical Power and Control Engineering inherently involves significant risks, including electric shock, arc flash, electrical burns, and mechanical injuries from rotating machinery or heavy equipment. Proactive and rigorous safety measures are not merely regulatory requirements but fundamental necessities to protect human life and prevent damage to valuable university property and equipment. The curriculum itself highlights the practical nature of the program, with courses like Electrical Engineering Workshop and Industrial Wiring and Design emphasizing hands-on work.

Embedding comprehensive safety education within the EPCE curriculum is crucial for the holistic development of future electrical engineers. It fosters a deep-seated culture of responsibility, hazard awareness, and risk mitigation, preparing graduates to operate safely and ethically in professional environments. This approach ensures that graduates are not only technically proficient but also socially

responsible and capable of adhering to global professional safety standards.

1.2 Alignment with ASTUs Vision and Mission

ASTU's overarching vision to become the first choice in Ethiopia and the premier center of excellence in applied science and technology in Africa by 2030 directly mandates a commitment to world-class safety standards. A robust health and safety framework is indispensable for an institution aspiring to such excellence. The university's mission to Produce ethical and internationally competent graduates in applied science and technology through quality education is directly supported by prioritizing safety. By upholding stringent safety measures, the university ensures its graduates are well-prepared for professional practice, understanding the critical importance of safety in engineering disciplines.

2. General Health and Safety Framework of ASTU

Adama Science and Technology University is committed to fostering a safe and healthy environment for its entire academic community. The Senate Legislation serves as the foundational document, outlining the university's dedication to creating a conducive environment that nurtures excellence. This commitment inherently extends to ensuring robust health and safety provisions across all academic and operational units.

The ASTU Senate Legislation establishes the overarching framework and the consequences for non-compliance. While it does not detail specific electrical safety protocols, Article 231.3.11 mentions Serious breach of any regulation issued by a competent University authority, such as laboratory. This indicates that detailed, specialized safety regulations for specific areas like Electrical Power and Control Engineering laboratories are expected to be developed and issued by the relevant competent University authority. Any violation of the specific safety rules outlined within this manual would directly fall under the disciplinary provisions detailed in the broader Senate Legislation, elevating this manual from a mere guideline to a formally enforceable document within ASTU's regulatory structure.

2.1 Student Rights and Duties Regarding Safety

Students at ASTU are afforded fundamental rights, including the right to campus security for themselves and for their personal property. Furthermore, they are guaranteed due process in disciplinary matters, ensuring fairness in addressing any safety-related infractions.

Alongside these rights, students bear significant responsibilities concerning safety. They are mandated to Make proper use and care of university property, which directly extends to Electrical Power and

Control Engineering equipment and facilities. In the context of the EPCE program, proper use and care of university property directly translates to adhering to safe operating procedures for electrical equipment, machinery, and laboratory facilities. Improper use can lead not only to equipment damage but, more critically, to serious injury.

Crucially, students have a proactive duty to Report to the concerned bodies any willful violation of rules and regulations by any members of the community, fostering a collective safety vigilance. This means students are not merely recipients of safety rules but are expected to be active custodians of safety, empowered to identify and report unsafe acts or conditions. All students are expected to Observe the rules and procedures of the University and respect the laws of the country, which includes adherence to this safety manual.

The Senate Legislation explicitly lists acts that are subject to disciplinary action. Those particularly relevant to safety include: dishonest conduct (e.g., cheating on safety assessments), disorderly conduct, assault, threats, and provocation thereto. Possession of arms or other harmful weapons, trafficking of pornographic materials, and possession or use of drugs or alcohol are strictly prohibited due to their potential to impair judgment and create unsafe conditions. Theft or misappropriation of University property and, most pertinently, Serious breach of any regulation issued by a competent University authority, such as laboratory are grounds for disciplinary action. The university places a dual and active responsibility on students: to utilize university resources properly and to actively contribute to a safe environment by recognizing and reporting violations. This transforms safety from a passive compliance requirement to an active, participatory role, emphasizing shared accountability.

2.2 Staff Responsibilities in Health and Safety

Academic staff at ASTU are expected to be scholars fully devoted to the advancement of knowledge, carrying out their functions in the best interest of the University and that of the Nation, having due

regard to the rules of his profession. This inherently includes a commitment to safety. They must observe the code of ethics relevant to his profession, which for engineers, includes professional safety standards.

Staff are responsible for taking good care of all University property under his possession and are bound to Accept instructions of his superiors where such instructions are not contrary to the law and the terms and conditions of his contract of employment, including safety directives. A conducive environment for academic pursuits, particularly in a high-risk field like Electrical Power and Control Engineering, is fundamentally a safe environment. For academic staff, especially those supervising practical work in laboratories and workshops, their professional code of ethics must encompass a strong commitment to health and safety. This includes ensuring that experiments are conducted safely, equipment is used correctly, and students are adequately supervised and instructed on safety procedures.

The Senate Legislation outlines severe consequences for academic staff who fail to uphold their duties. Repeated and willful failure to perform any one or all of the obligations stipulated in one's contract and/or any one or all of the duties and responsibilities specified under the provisions of Article 41 and 42 constitutes a serious breach of duty. This specifically includes neglect of duties, breach of professional code of conduct, which can encompass a failure to enforce or adhere to safety protocols. A failure to uphold these safety responsibilities could be interpreted as a neglect of duties or a breach of professional code of conduct under Article 65.5. Academic staff bear a significant responsibility not only for their personal safety but also for the safety of students under their supervision. This responsibility is implicitly derived from their professional duties, ethical obligations, and the mandate to foster a conducive learning environment.

2.3 University Property Use and Care

ASTU Senate Legislation clearly stipulates that the use of any university's property by an academic staff member for personal purposes is subject to the written approval of the appropriate university's officer. Similarly, students are explicitly responsible for the proper use and care of university property.

In the context of the EPCE program, University property includes sophisticated and potentially dangerous electrical power and control engineering equipment, tools, and infrastructure. Unauthorized personal use, improper care, or unapproved modifications to this equipment can compromise its operational integrity, lead to malfunctions, and create severe safety risks for current and future users. This is not merely an issue of asset management but a direct safety concern, as altered or poorly maintained equipment can become a hazard. This general rule has profound implications for preventing misuse, unauthorized modifications, and negligent handling of electrical equipment, all of which can directly lead to significant safety hazards.

2.4 Reporting Violations and Disciplinary Matters

The Senate Legislation provides a robust framework for addressing non-compliance, detailing acts constituting Breach of Duty and/or Violation of Disciplinary Regulations for academic staff and students. These explicitly include neglect of duties, breach of professional code of conduct for staff and, critically, Serious breach of any regulation issued by a competent University authority, such as library, laboratory, cafeteria and dormitory for students.

Disciplinary actions for such violations can range from reprimand and fines to suspension and, in severe cases, dismissal. Furthermore, students have a clear Responsibility to report violations of the code of conduct, promoting a culture of collective vigilance. Safety non-compliance within the EPCE program is not merely a technical

oversight but a serious disciplinary offense, underscoring the gravity with which ASTU treats adherence to its rules and the ethical responsibilities of its community members. The existing disciplinary framework provides a clear and enforceable mechanism for addressing safety violations.

2.5 Emergency Procedures and Preparedness

Effective emergency response is paramount in an environment involving electrical hazards. EPCE has established an emergency management committee specifically tasked with addressing special provisions for time of crisis, underscoring the program's commitment to preparedness.

3. General Emergency Response

In any emergency, the primary objectives are to ensure the safety of individuals, prevent further harm, and facilitate rapid and effective intervention. The university's general guidelines for crisis situations apply, emphasizing clear communication and adherence to established protocols.

3.1 Fire Safety and Evacuation Protocols

Fire is a significant risk in electrical power and control engineering environments due to the presence of combustible materials, energized circuits, and heat-generating equipment. Proactive measures, such as good housekeeping (regularly emptying bins, avoiding accumulation of combustible material, keeping cables tidy) and turning off equipment at the end of the working day, are crucial for prevention.

In the event of a fire or suspected fire, the following steps must be taken immediately:

- **Sound the Alarm:** Activate the nearest fire alarm call point. If no alarm is present, alert occupants by shouting fire and knocking on doors while evacuating.
- **Evacuate Immediately:** Leave the building via the nearest clear fire escape route. Fire escape routes must be kept clear of obstructions, and fire doors must remain self-closing and never be wedged open. Lifts must not be used during evacuation unless specifically designated for assistance.
- **Assist Others Safely:** Only attempt to rescue others if it can be done without endangering personal safety.
- **Assemble at Designated Point:** Move at least 50 feet away from the building to the designated assembly point.
- **Do Not Re-enter:** Do not re-enter the building until authorized by the university security.

3.2 First Aid and Injury Reporting Procedures

Immediate and appropriate first aid can significantly mitigate the severity of injuries.

- **Minor Injuries:** Refer minor injuries to a qualified first aider immediately. First aid kits are available in all laboratories and workshops.
- **Major Injuries:** For major injuries, contact the university's emergency contacts.
- **Electrical Shock:** In case of electric shock, **do not touch the person or equipment** until the power source is de-energized. Use a non-conductive object (e.g., a wooden stick, rubber mat) to separate the person from the power source if safe to do so. Once separated, contact a First Aider immediately.
- **Chemical Splashes (Eyes/Skin):** Immediately wash off any chemical that makes skin contact with water. For eye injuries, rinse eyes immediately with water using an eyewash station and seek medical examination.
- **Reporting All Incidents:** Any accident, incident, or near miss, regardless of injury, must be reported as soon as possible using the university's designated reporting system. Reports can be filed anonymously. All incidents should be reviewed and signed off by relevant coordinators within five working days.

3.3 Emergency Contacts and Communication

All EPCE students and staff must be familiar with and have ready access to emergency contact information. This information should be prominently displayed in all laboratories, workshops, and common areas.

Note: This table should be printed and displayed prominently in all EPCE facilities.

4. Electrical Safety in Laboratories and Workshops

The Electrical Power and Control Engineering program relies heavily on practical, hands-on learning experiences conducted in various specialized facilities. These environments, while essential for education, present unique electrical hazards that necessitate strict adherence to safety protocols.

4.1 Overview of EPCE Program Facilities

The EPCE program is equipped with several dedicated facilities to support its curriculum, including:

- Four Computer Laboratory Rooms
- One Machine Laboratory Room
- One Electrical Installation Workshop
- One Industrial Wiring and Motor Winding Workshop
- One Power System and Protection Laboratory
- One Power Electronics and Drive Laboratory
- One PLC Laboratory
- One Instrumentation and Process control Laboratory

Each of these facilities has specific equipment and operational procedures, and general safety rules apply across all, supplemented by course-specific requirements.

4.2 General Laboratory and Workshop Safety Rules

Adherence to general safety rules is fundamental to preventing accidents in all EPCE facilities. These rules are designed to create a safe working environment and must be followed by all students, staff, and visitors.

Rule Category	Specific Requirements			
Access & Supervision	Restricted access: Only authorized personnel with mandatory safety training and local induction may enter	Two-person rule: At least two individuals must be present when working on live circuits or chemical processing. Never work alone on live equipment (over 25V).	Sign-in/out: For out-of-hours lab work, staff and postgraduate researchers must sign in/out and keep mobile phones on.	Supervision: Students must work under professional supervision.
Work Area Organization & Housekeeping	Maintain neatness: Keep work area and workbench clear of unused items.	Cleanliness: Ensure the work area is clean and ready for others after finishing experiments.	Clear pathways: Do not leave equipment or cables on the floor that could cause tripping	Avoid clutter: Regularly empty bins and avoid accumulation of combustible material
Prohibited Items & Activities	No food/tobacco: Prohibited in labs. Beverages with secure lids may be permitted.	No horseplay: Strictly forbidden	No headphones: Do not wear headphones that block all sound	No unauthorized items: Do not bring or use unpermitted materials or devices.
General Conduct	Follow instructions: Adhere to all safety instructions and guidelines from instructors/supervisors	Report hazards: Immediately report any damages to equipment, hazards, or potential hazards to the laboratory instructor	No distractions: Do not distract others while they are operating equipment	

4.3 PPE Requirements

Appropriate Personal Protective Equipment (PPE) provides a crucial line of defense against electrical hazards such as shocks, burns, and arc flashes. All individuals working in EPCE laboratories and workshops must wear the required PPE as specified below and for specific tasks.

PPE Item	Purpose & Specific Requirements	Relevant Courses
Safety Glasses/Goggles	Protect eyes from flying debris, sparks, or intense light. Must be ANSI Z87.1 certified.	All labs/workshops, especially EPCE3203 (Electrical Engineering Workshop), EPCE3205 (Electrical Machines I), EPCE4205 (Industrial Wiring and Design)
Insulated Gloves	Provide protection against electrical shock. Made from materials like rubber.	All labs/workshops, especially when working with live circuits or high voltage.
Flame-Resistant (FR) Clothing	Resists ignition and minimizes flame spread, protecting against burns from arc flashes or electrical fires.	Recommended for all electrical work, mandatory for high-voltage or high-current tasks.
Insulated Footwear (Closed-toe shoes)	Protects against electrical shock by reducing current flow through the body. Closed-toe shoes are	All labs/workshops, industrial internships.

	mandatory in all labs. Steel-toed boots may be required in some workshops/internship sites.	
Dielectric Hard Hats	Protects the head from electrical shock and falling objects. Made from non-conductive materials.	Industrial Wiring and Motor Winding Workshop, Power System and Protection Laboratory, industrial internships.
Protective Hearing Equipment	Protects against loud noises that can damage hearing during electrical work.	Electrical Machine Laboratory, Industrial Wiring and Motor Winding Workshop.
Lab Coats/Appropriate Clothing	Protects personal clothing from chemicals/spills. Avoid loose clothing, ties, scarves, or jewelry that could get caught in moving machinery or contact circuits. Long hair must be secured.	All labs/workshops.

4.4 Specific Electrical Safety Protocols

Working with electricity requires specialized knowledge and strict adherence to protocols to mitigate severe hazards.

- **Working with Live Circuits:**
  - **Treat all circuits as live:** Always assume a circuit is energized unless it has been proven otherwise through proper testing and de-energization procedures.
  - **One-hand rule:** When making AC measurements or working on circuits, form the habit of using only one hand, keeping the other hand at your side or in your pocket, away from all conductive material. This reduces the likelihood of current passing through the chest cavity in case of accidental shock.
  - **Dry conditions:** Never handle electrical equipment when hands, feet, or body are wet or perspiring, or when standing on a wet floor. Regard all floors as conductive and grounded unless covered with well-maintained, dry rubber matting.
  - **Non-conductive tools:** Use only tools and equipment with non-conducting handles when working on electrical devices.
  - Checking for overheating: When necessary to touch electrical equipment (e.g., checking for overheated motors), use the back of the hand. This prevents muscular contraction from freezing the hand to the conductor if accidental shock occurs.

- **Lockout/Tagout Procedures:**

Lockout/Tagout (LOTO) procedures are critical to ensure that electrical equipment and systems are de-energized and cannot be accidentally re-energized during maintenance, repair, or other work activities. This practice helps prevent injuries and fatalities caused by unexpected energization.

  - **Develop a LOTO program:** A comprehensive LOTO program outlining specific procedures, responsibilities, and requirements for equipment and personnel must be established.
  - **Identify energy sources:** Before working on electrical equipment, ensure all energy sources are properly isolated and controlled.
  - **Shut down and isolate:** Switch off power and physically isolate energy sources (disconnect, block, or prevent energy flow).
  - **Apply LOTO devices:** Attach lockout devices (e.g., padlocks) to energy-isolating mechanisms and warning tags to inform others that the equipment is locked out and should not be operated.
  - **Verify de-energization:** Always test equipment with appropriate instruments to ensure it is de-energized before beginning work. This verification should be done at least twice.

- **High Voltage Safety:**

Equipment operating at or exceeding 50 volts AC or 120 volts DC is considered dangerous. Power supplies

delivering energy in excess of 10 J at more than 50 V are potentially hazardous.

- **Warning signs:** Appropriate warning signs must identify electrical hazards in areas or equipment accessible to unqualified personnel.
- **Capacitor discharge:** Drain capacitors before working near them or removing the device from service, and keep the short on the terminals during work as some charge may return due to dielectric effect. Manual-grounding devices must be installed and used with capacitors, even if automatic discharge systems are present. All terminals must be grounded at least twice for full discharge.
- **Guarding:** Live parts of electric equipment operating at 50 volts or more must be guarded against accidental contact, for example, with Plexiglas shields.
- **Prohibited items:** Never use metallic pencils or rulers, or wear rings or metal watchbands when working with high voltage electrical equipment.
- **Trained personnel**: Repairs of high voltage or high current equipment should only be performed by trained electricians or laboratory workers who have received specialized electrical safety training.

- **Circuit Protection and Overload Prevention:**

Circuit protection devices (fuses, circuit breakers, GFCIs, AFCIs) safeguard electrical systems from damage caused by overloads, short circuits, and ground faults.

- **Proper sizing:** Choose appropriate circuit protection devices based on the electrical system and equipment requirements, ensuring ratings comply with voltage, current, and standards.
- **Avoid overloading**: Do not plug multiple high-power devices into a single extension cord. The total electrical load of all devices connected to a single circuit should not exceed the circuit's capacity. As a safety measure, avoid exceeding 80% of the circuit's capacity.
- **Extension cords:** Limit the use and length of extension cords. They should not be used in place of permanent wiring. Discard unsafe cords (cracked/broken insulation, damaged grounding pin). Power strips should not be permanently mounted or daisy-chained (connected to each other), as this can overload the circuit.
- Multi-plug adapters: Must have circuit breakers or fuses.

- **Equipment Inspection, Maintenance, and Grounding:**
  - **Regular inspection:** Inspect wiring of equipment before each use and replace damaged or frayed electrical cords immediately. Regularly check equipment for wear, damage, overheating, loose connections, and corrosion.
  - **Proper grounding:** All equipment should have 3-prong plugs to provide a safe path to ground for internal electrical short circuits. Ensure all metal parts of electrical equipment are properly grounded. Periodically inspect the

grounding system for proper connections, corrosion, or damage.

- **Maintenance:** Equipment should be regularly checked and maintained. The frequency and thoroughness of maintenance may need to increase based on experience or historical records of failures.
- **Reporting equipment issues**: Equipment producing a tingle or any signs of damage should be reported promptly for repair. Do not rely on grounding to mask a defective circuit or attempt to correct a fault by inserting another fuse, especially one of larger capacity.
- **PAT Testing**: Mains-powered electrical items brought on site must receive a Portable Appliance Test (PAT) before use. Any constructed mains-powered equipment must also be tested and PAT certified before regular use.

- **Handling of Electrical Tools and Instruments:**
  - Use only insulated tools rated for the voltage and current specified.
  - Regularly inspect tools for damage.
  - When unplugging a power cord, pull on the plug, not on the cable.
  - Always check that the power switch is OFF before plugging into an outlet, and turn instrument or equipment OFF before unplugging.

- **Environmental Considerations:**

- **Moisture and humidity**: Increase the risk of electrical shock. Use GFCIs and ensure equipment is rated for wet locations. Minimize the potential for water or chemical spills on or near electrical equipment. If a spill occurs, shut off power at the main switch or circuit breaker and unplug the equipment.
- **Dust and debris**: Accumulation can cause overheating, reduced performance, or fires. Regularly clean equipment and consider dust-tight enclosures.
- **Temperature extremes**: Can affect equipment performance and lifespan. Consider temperature controls or insulation.
- **Corrosive or hazardous environments**: Can damage electrical equipment. Follow proper maintenance procedures.
- **Space constraints**: Limited space can restrict airflow, leading to overheating. Ensure equipment is not obstructed.
- **Vibration and mechanical stress**: Can damage equipment. Ensure secure mounting and protection.

4.5 Course-Specific Safety Requirements

The EPCE curriculum includes various courses with specific practical components requiring particular safety considerations and equipment.

5. Safety During Industrial Internships

Industrial internships are an integral part of the EPCE curriculum, providing students with invaluable real-world experience. The curriculum includes two mandatory industrial internships: Industry Internship-I (EPCE3200) and Industry Internship-II (EPCE4200). These internships aim to encourage students to apply theoretical knowledge in industrial environments, acquire practical industry experience, gain insight into real-world engineering challenges, and develop professional competencies. They also focus on problem-solving skills, project management abilities, teamwork, communication, and technical reporting, fostering innovation through industry-based project design and strengthening university-industry cooperation.

Given the inherent hazards in industrial settings, stringent safety protocols must be observed during these placements.

5.1 Pre-Internship Safety Training and Orientation

Before commencing any industrial internship, students must undergo mandatory safety training and orientation provided by the program and, where possible, the host organization. This training will cover:

- General industrial safety principles.
- Awareness of common manufacturing and industrial hazards, including moving parts, complex processes, and sharp edges.
- Importance of Personal Protective Equipment (PPE) in industrial settings, including site-specific requirements.
- Emergency procedures specific to industrial environments.
- Reporting protocols for incidents, accidents, and near misses during the internship.

5.2 On-Site Safety Guidelines

Upon arrival at the internship site, students must:

- **Pay Attention to Safety Training:** Actively participate in and comprehend any safety training provided by the host company.
- **Adhere to Site-Specific PPE:** Always wear the required PPE for the specific facility and task, which may include safety glasses (ANSI Z87.1 certified), closed-toe shoes (potentially steel-toed boots), safety gloves, hard hats, and reflective vests. Some facilities may require long-sleeved shirts or Kevlar arm protection.
- **Wear Appropriate Clothing:** Avoid loose-fitting clothing, ties, scarves, or jewelry that could become entangled in moving machinery. Long pants are generally recommended, and shorts are often not considered professional or safe attire in manufacturing environments.
- **Know Your Surroundings:** Be highly self-aware and observant of the work environment. Take note of potential hazards (e.g., sharp edges, moving parts, cables on the floor), emergency exits, bathrooms, and restricted areas. Understand who to contact for specific issues.
- **Maintain a Clean Work Area:** Keep the physical workstation clean and organized, ensuring equipment, tools, or materials do not obstruct others or block egress points.
- **Be Aware of Vehicle Traffic:** Always be aware of the presence of Powered Industrial Vehicles (PIVs), Automated Guided Vehicles (AGVs), and forklifts. Make eye contact with drivers to ensure they are aware of your presence.
- **Pack the Basics:** Be prepared with necessary PPE and basic tools (e.g., multi-meter, screwdrivers, wire cutters). Consider packing water and healthy snacks for long hours.
- **Reporting Incidents and Near Misses:** Any accident, injury, or near miss occurring during the internship must be immediately reported to the on-site supervisor and the ASTU EPCE Department internship coordinator. This ensures proper documentation, investigation, and support.

5.3 University and Student Responsibilities during Internships

The university maintains oversight of student internships to ensure safety and educational value. Students are expected to uphold the university's code of conduct and safety standards even when off-campus. The university will facilitate communication with host organizations regarding safety expectations and provide support in case of incidents. Students are responsible for promptly communicating any safety concerns or incidents to the university.

6. Health and Safety Responsibilities

A robust health and safety framework requires clear delineation of responsibilities and a comprehensive training program to ensure that all members of the EPCE community possess the necessary knowledge and skills to work safely. The Department is committed to promoting safety through active management of its hazards and activities, ensuring the safety, health, and welfare of all staff, students, visitors, and contractors.

6.1 Roles and Responsibilities Management

Effective safety management is a shared responsibility, with specific roles contributing to the overall safety culture:

- **Department Head (EPCE):** Responsible for overall safety within the department, including allocating sufficient resources (people, money, facilities) to plan, implement, monitor, and review safety systems. This includes authorizing policies and procedures related to safety.
- **Academic Staff/Course Instructors:** Responsible for ensuring safe teaching and research practices, providing clear safety instructions for their courses, supervising students in laboratories and workshops, and enforcing safety rules. They must integrate safety into their teaching materials and lab sessions, as indicated in various course syllabi (e.g., EPCE2101, EPCE3203).
- **Laboratory/Workshop Technicians:** Responsible for the day-to-day enforcement of safety rules, maintenance of equipment, ensuring proper functioning of safety devices, and providing immediate guidance during practical sessions. They are often the first point of contact for equipment issues and minor incidents.
- **Students:** As outlined in Section II, students have a duty to adhere to all safety rules, use university property properly, report hazards and violations, and participate actively in creating a safe environment.

6.2 Competency Requirements for Electrical Work

UTSA's policy regarding electrical work and modifications states that individuals must be trained, certified, and/or competent to perform such tasks. Similarly, the University of Nottingham emphasizes that a competent person carrying out inspections or work must have sufficient information and knowledge, and training should be provided. This principle is critical for ASTU's EPCE program.

- **Qualified Personnel:** Only personnel deemed competent through training and experience are authorized to work on electrical systems, especially those involving high voltage or complex circuits.
- **Supervision:** Students performing practical work must always be under the supervision of competent academic staff or technicians.
- **Continuous Development:** Academic staff and technicians involved in practical instruction should continuously update their knowledge of electrical safety standards and best practices.

7. Conclusion and Continuous Improvement

This Health and Safety Manual for the EPCE program is designed to serve as a foundational document for fostering a secure and productive learning environment. By integrating ASTU's legislative framework, the EPCE curriculum's practical requirements, and international best practices in electrical safety, this manual provides a comprehensive guide to hazard identification, risk mitigation, and emergency response.

The successful implementation of this manual hinges on a collective commitment to safety from every member of the EPCE community students, academic staff, researchers, and visitors. Adherence to the outlined protocols is not merely a matter of compliance but a fundamental aspect of professional responsibility and ethical conduct in engineering.

To ensure its continued relevance and effectiveness, this manual must be a living document, subject to periodic review and updates. Departmental safety policies and risk assessments should be reviewed annually or whenever changes in legislation, university policies, or incident profiles necessitate. This continuous improvement process, informed by feedback, incident analysis, and evolving best practices, will ensure that the EPCE program at ASTU remains at the forefront of safety in electrical engineering education, aligning with its vision to produce ethical and internationally competent graduates.

Note: *This handbook is a living document and may be subject to revisions and updates. Staff members will be informed of any significant changes.*