Safety and Incident Management Plan

Computer Integrated Manufacturing (CIM) Lab

Department of Mechanical and Production Engineering (MPE),
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Introduction

The Computer-Integrated Manufacturing (CIM) Systems Lab serves as a crucial learning and research facility for the undergraduate program in Mechanical Engineering at Ahsanullah University of Science and Technology (AUST). Equipped with advanced tools such as 3D printers, CNC simulators, and manufacturing control system simulators, the lab provides students with hands-on experience in integrating computers into manufacturing processes. Through activities in product design, process planning, manufacturing, and production control, the lab bridges the gap between theoretical knowledge and industrial applications.

Objective
To develop and implement a comprehensive plan that ensures the safety of students and staff in the Computer-Integrated Manufacturing Systems (CIM) Lab, preventing incidents and managing accidents effectively, while meeting accreditation requirements.

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1. Laboratory Safety Rules

1. **General Rules**
    - PPE such as safety goggles and anti-static wrist straps must be used when operating certain equipment (e.g., CNC simulators and manufacturing control systems).
    - Access to the lab is restricted to authorized personnel during scheduled lab hours.
    - Eating, drinking, and the use of personal electronic devices unrelated to lab work are strictly prohibited.
    - Students must familiarize themselves with the lab's emergency protocols before commencing work.
2. **Behavioral Rules**
    - Follow all instructions provided by the Lab In-Charge and Lab Assistant/Attendant.
    - Maintain a clean and organized workspace.
    - Report any equipment malfunction or unsafe condition immediately to the Lab Assistant/Attendant.
    - Avoid physical interference with machines or other students during lab sessions.
3. **Equipment-Specific Rules**

- For **3D Printers**:
  - Ensure proper ventilation while operating the printer to minimize exposure to fumes.
  - Avoid touching moving parts during operation.
- For **CNC Simulators**:
  - Use simulation software only after completing the designated training.
  - Verify all programming inputs before executing a simulation.
- For **Manufacturing Control System Simulators**:
  - Ensure that control panels and systems are powered down after use.

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2. Safety Procedures and Practices

1. **Before Lab Sessions**
   - The Lab In-Charge conducts weekly inspections of all equipment for functionality and safety compliance.
   - The Lab Assistant/Attendant verifies the availability of first aid kits and ensures that fire extinguishers are operational.
   - An orientation session is conducted at the start of each semester to familiarize students with lab safety protocols and equipment usage guidelines.
2. **During Lab Sessions**
   - Students operate equipment only under direct supervision.
   - The Lab Assistant/Attendant monitors student activities to ensure compliance with safety procedures.
   - Risk-prone operations, such as 3D printing and CNC simulation, are conducted following strict guidelines.
3. **After Lab Sessions**
   - All machines and equipment must be powered down and properly secured.
   - The Lab Assistant/Attendant logs any equipment issues or maintenance requirements.
   - Waste materials, such as printer residues or manufacturing by-products, are disposed of following environmental safety standards.

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3. Provisions in Case of Accidents and Health Hazards

1. **Emergency Equipment**
   - **First Aid Kit**: Fully stocked and easily accessible, containing items such as bandages, antiseptics, and burn treatments.

- **Fire Extinguishers**: Strategically placed near 3D printers and CNC simulators and regularly inspected for functionality.
- **Emergency Power Shutoff**: Clearly marked and functional for all electrical equipment in the lab.

2. **Emergency Response**
   - **Minor Incidents**:
     - The Lab Assistant/Attendant provides immediate first aid and records the incident in the Lab Incident Report Log.
   - **Major Incidents**:
     - The Lab In-Charge contacts the Warden and Assistant Warden, who are part of the AUST Fire/Disaster Safety Team, for further assistance.
     - Emergency services are called if required.
3. **Evacuation Procedures**
   - Follow the university's established evacuation plan in the event of a major incident.
   - The Lab In-Charge leads the evacuation while the Lab Assistant/Attendant ensures that all individuals have safely exited the lab.

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4. Roles and Responsibilities

1. **Lab In-Charge**
   - Oversee the implementation of safety protocols and supervise all lab activities.
   - Conduct periodic safety audits and organize student safety training.
   - Act as the primary point of contact for emergencies and coordinate with the Warden/Assistant Warden.
2. **Lab Assistant/Attendant**
   - Conduct routine equipment checks and ensure the availability of safety supplies.
   - Supervise students during lab sessions and enforce compliance with safety rules.
   - Administer first aid and assist with evacuation in case of emergencies.
3. **Students**
   - Comply with all safety rules and equipment usage guidelines.
   - Report any unsafe conditions or equipment malfunctions promptly.
   - Avoid operating machinery without prior training or authorization.

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5. Documentation for Accreditation

1. **Safety Manual**

    - A comprehensive document detailing lab safety protocols, equipment operation guidelines, and emergency procedures.
2. **Incident Log**
    - Maintain a Lab Incident Report Log for documenting accidents, near-misses, and corrective actions taken.
3. **Inspection and Maintenance Records**
    - Maintain records of periodic equipment inspections, safety drills, and training sessions.

Conclusion

This detailed plan ensures a safe and compliant environment in the Computer-Integrated Manufacturing Systems Lab. By focusing on safety protocols, emergency readiness, and effective management practices, the lab aligns with accreditation standards and fosters a secure learning space for students and staff.