Texas Essential Knowledge and Skills for Career and Technical Education

Subchapter: Law, Public Safety, Corrections and Security

OSET II - Hazard Controls (Two Credits).

a) General Requirements: This course is recommended for students in Grades 10-12. Recommended perquisite: OSET I.

b) Introduction: Students will analyze the accident sequence; investigate hazard control concepts and principles; and examine fire protection systems and their applications with emphasis on the fire prevention codes and standards. Students apply critical thinking skills to analyze system safety, organizational cultures, and the importance of leadership. Students will describe the organization of the accident investigation, from beginning to end. Students will examine analytical techniques in accident investigations. Students will utilize analytic accident investigations techniques in order to assist organizations in preventing accidents. Students will gain knowledge and skills necessary to make proactive hazard control an organizational priority. Students will examine the effects of communication skills regarding efforts to control hazards.

End-of-Course Outcomes:

- Describe and define the physics, natural attributes, and characteristics of heat transfer, noise, mechanical vibration, and abnormal pressures.
- Recognize and describe the health effects of exposure to the physical agents
- Identify appropriate physical parameters to be measured for assessing exposure to the physical agents.
- Design, select, and evaluate appropriate administrative, engineering, personal protective equipment, and other control measures to reduce exposure to the physical agents to acceptable levels.
- Explain the elements of fire chemistry theory and summarize fire protection methods
- Describe appropriate application of each fire protection method
- Identify the applicable codes and standards in the industrial/business environment
- Identify, investigate, understand, analyze accident cause and effect
- Recognize and assume accountability and responsibility
- Differentiate hazard and failure
- Document and report accident investigation

c) Knowledge and skills.
    1. The student achieves the academic knowledge and skills required to prepare for postsecondary education and a career in Occupational Safety and Health Technology. The student is expected to:

A. Use communication skills to evaluate body language, gestures, verbal tone, and inflection;
B. Use interpersonal communication skills; and
C. Use writing skills to facilitate effective field note taking and report writing such as hazard control reports.

2. The student demonstrates an understanding of the fundamental principles of hazard control plans. The student is expected to:
    A. Describe the main responsibilities of supervisors, managers, and members of an organization;
    B. Develop requirements for maintenance and tools for measurement;
    C. Identify procedures analyze and control hazards and risky operations;
    D. Create successful processes for communicating feedback to stakeholders;
    E. Create safe methods for investigating accidents;
    F. Describe processes for analysis of hazards; and
    G. Implement concise methods for adhering safe practices.

3. The student examines effective and safe working environments. The student is expected to:
    A. Explain the significance of periodic inspections for hazard control;
    B. Compare and contrast various types of hazards, including biological hazards, chemical hazards, ergonomic hazards, physical hazards, and psychosocial hazards;
    C. Describe common factors in safe workplaces;
    D. Use observation skills to identify hazards and pinpoint unsafe behaviors; and
    E. Create well-designed checklists for inspection.

4. The student describes the steps to change analysis. The student is expected to:
    A. Define the problem at hand;
    B. Establish what appropriate situation should have occurred;
    C. Pinpoint and describe the change;
    D. Delineate what was affected by the change;
    E. Specify individual aspects of the change; and
    F. List possible causes and choose the most likely cause(s).

5. The student demonstrates an understanding of the importance of personal protective equipment. The student is expected to:
    A. Discuss the benefit and purpose for protection of the body, specifically protection to the eyes, face, head, feet, arms, hands and torso;
    B. Discuss the role an employer plays in maintaining the proper maintenance and sanitation of protective devices;
    C. Discuss the role an employer plays in training employees in the proper utilization of devices;
    D. Understand the purpose of the written certification of training, required by employers annually; and

E. Explain the role of the hazard control committee and its contribution to the success of hazard control in the workplace.

6. The student evaluates hazard control function effectiveness. The student is expected to:
    A. Discuss the significance of the hazard control audit for preventative purposes, rather than waiting for an injury analysis;
    B. Describe the importance of reviewing plans, policies and records of an organization;
    C. Explain the rationale behind interviews, questionnaires and observations of employees in the audit process;
    D. Compare and contrast effective and ineffective hazard control symptoms; and
    E. List ways in which hazard control effectiveness can be improved.

7. The student demonstrates an understanding of effective management and leadership in regards to accident prevention efforts in an organization. The student is expected to:
    A. Describe the characteristics of an effective leader;
    B. Analyze ethics in leadership;
    C. Explain the role of safety management;
    D. Define organizational culture; and
    E. Compare and contrast a multitude of management theories.

8. The student uses effective communication processes. The student is expected to:
    A. Explain the communication process via written, spoken, or non-verbal means;
    B. Analyze barriers to communication;
    C. Organize information using a systematic process;
    D. Describe the purpose behind what is being communicated;
    E. Write an effective report, including a summarization of incident, findings and recommendations; and
    F. Describe the effect a lack of communication skills could have on efforts to control hazards.

9. The student demonstrates an understanding of accident causation. The student is expected to:
    A. Compare and contrast a multitude of accident causation theories, including Multiple-Causation Theory and Biased-Liability Theory;
    B. Analyze human factors that lead to accidents;
    C. Identify errors that lead to accidents, including poor judgment and memory lapse;
    D. Explain common unsafe action such as purposefully working at unsafe speeds or knowingly using unsafe tools; and
    E. Demonstrate the ability to motivate people to work safely.

10. The student understands the process of accident report, accident investigations and accident analysis. The student is expected to:
    A. Describe the importance of reporting an accident in a timely fashion;
    B. Determine patterns or trends in accidents reported;
    C. List hazards, injuries or accidents to be tracked;
    D. Explain the importance of maintaining records for data acquisition;
    E. Develop an accident report form;
    F. Develop a clear and concise process for submitting accident reports;
    G. Explain the process for completing an accident investigation;
    H. Identify and report causal factors;
    I. Analyze sound investigative techniques;
    J. Identify failures of management in an organization;
    K. Describe the importance of accident analysis;
    L. Compare and contrast varying process for accident analysis; and
    M. Use findings to create proper controls.

11. The student evaluates the hazard control functions in varying organizational settings. The student is expected to:
    A. List actions to prevent or reduce slips, trips and falls;
    B. Describe the importance of electrical safety and measures to reduce electrical hazards;
    C. Describe steps to reduce noise exposure;
    D. Review the noise reduction rating (NRR) as developed by the Environmental Protection Agency (EPA);
    E. Describe possible hazards related to heating, ventilation, and air conditioning systems;
    F. Describe possible hazards related to indoor air quality, including ventilation and adequate air flow;
    G. Identify steps to reduce hazards related to general machine and tool safety;
    H. Identify steps to reduce hazards related to powered industrial trucks; and
    I. Describe possible hazards related to ladder and scaffolds.

12. The student demonstrates an understanding of hazardous materials management. The student is expected to:
    A. Describe ways in which hazardous materials can enter the body;
    B. Analyze the chemical concentration and exposure duration and its effects;
    C. Compare and contrast ways to reduce exposure to hazardous chemicals or materials;
    D. Explain varying ways to protect respiration from harmful airborne substances;
    E. Describe the physical properties of hazardous materials;
    F. Explain the purpose and importance of eye washes and emergency showers;
    G. Explain the purpose and importance of proper chemical storage; and
    H. Discuss the significance of compressed gas safety.

13. The student demonstrates an understanding of the OSHA hazard communication standard and OSHA requirements for organizations. The student is expected to:
    A. Develop and implement a hazard communication plan;
    B. Describe the globally harmonized system;
    C. Discuss the impact of hazard communication standard changes to organizations;
    D. Analyze and discuss safety data sheets and safety data sheet changes, including labeling requirements; and
    E. Simulate employee training of OSHA standards.

14. The student explains the impact of fire safety and emergency management in relation to hazard control. The student is expected to:
    A. Describe the purpose and importance of the written fire prevention plan in the workplace;
    B. List proper storage techniques for flammable or combustible materials;
    C. Explain the stages of fire development;
    D. Describe deficiencies in fire safety;
    E. List general fire alarm requirements;
    F. Discuss importance of fire systems inspections;
    G. Describe the importance of fire confinement;
    H. Describe the importance of emergency exits and emergency lighting; and
    I. Describe the importance of portable fire extinguishers, including the maintenance of portable fire extinguishers.

15. The student uses career planning concepts, tools and strategies to explore, obtain, and develop a career in the area of accident investigations. The student is expected to:
    A. Discuss the benefits and purpose of accident investigations to business and industry;
    B. Use communication skills, written and oral, to create accident investigations reports; and
    C. Compare and contrast roles and responsibilities, licensing and certification programs for careers related to investigation and prevention of accidents.

16. The student demonstrates an understanding of the fundamental principles of an accident investigation. The student is expected to:
    A. Determine the accident sequence;
    B. Compare and contrast accidents and near misses;
    C. Locate the causal factors if an accident;
    D. Recommend corrective actions;
    E. Update the overall safety program;
    F. Develop a proper report of an accident investigation;
    G. Analyze the benefits of organizational incentive programs for accident reporting;
    H. Examine the expense often related to the occurrence of accidents;
    I. Identify systemic issues in an organization in order to prevent accidents;

J. Discuss benefits to accident prevention, both financially and personally;
K. Explain legal compliance including OSHA regulations and worker's compensation claims;
L. Define levels of accident investigations; and
M. Compare and contrast accident categorization including near miss, minor injury, major injury and catastrophic injury.

17. The student analyzes different theories of accident investigation and determines which theory best suits each accident being investigated. The student is expected to:
    A. Compare and contrast different accident investigation theories including Heinrich's Domino Theories and the Haddon Matrix Theory, among others;
    B. Explain the Accident Ratio Study;
    C. Analyze reporting of small damage and near misses and future prevention of major accidents;
    D. Explain the loss causation model;
    E. Compare and contrast unsafe acts and unsafe conditions and the subsequent relationship to loss;
    F. Discuss questioning techniques when determining causation;
    G. Compare and contrast factors contributing to an investigation, including human factors, equipment factors, and environmental factors; and
    H. Apply accident causation theories to an accident;

18. The student uses the analytical approach to investigate accidents. The student is expected to:
    A. Describe the concept of analysis in relation to accident investigations;
    B. Develop an accident sequence after careful investigation, including conducting interviews and taking photographs;
    C. Analyze the phases of an accident investigation;
    D. Evaluate the series of events leading up to an accident;
    E. Use a structured process to determine the accident sequence; and
    F. Examine root causes and root cause analysis;

19. The student will effectively organize an accident investigation. The student is expected to:
    A. Gather information, including documenting facts and interviewing those involved;
    B. Identify various types of evidence;
    C. Collect and preserve various types of evidence;
    D. Discuss the purpose of interviewing those involved and witnesses;
    E. Examine the importance of causal analysis; and
    F. Use the analytical process to understand the issues at hand and to prevent future accidents.

20. The student will explain differing investigative techniques for accident investigation. The student is expected to:
    A. Describe the purpose for a formal written accident investigations policy;
    B. Describe the purpose for an emergency response plan;
    C. Explain the facets of accident investigation training;
    D. Describe the purpose for an accident investigations kit;
    E. Analyze process of evidence collection;
    F. Describe the different types of evidence, including physical evidence and photographic evidence;
    G. Describe effective means of gathering evidence;
    H. Describe effective methods of interview;
    I. Describe effective methods of gathering photographic evidence;
    J. Examine the role of the accident log, the accident form and the accident report in accident investigation;
    K. Develop a list of questioning and simulate an interview with a witness to an accident; and
    L. Simulate a list of evidence to be collected and photographs to be taken at a mock accident.

21. The student demonstrates an understanding of the analytical process in relation to accident investigations. The student is expected to:
    A. Conduct causal analysis after careful evidence collection;
    B. Describe various levels of accountability, including worker level and supervisor level accountability;
    C. Compare and contrast hazards in an organization versus failures in an organization;
    D. Compare and contrast analytical techniques, including events and causal factors analysis and change analyses; and
    E. Discuss the benefits of utilizing varying different analytical techniques in accident investigations.
    F. Compare and contrast analytical techniques including events and causal factors analysis, change analysis, barrier analysis and tree analysis.

22. The student demonstrates an understanding of accident prevention and the principle of an effective corrective action plan. The student is expected to:
    A. Describe the purpose of corrective actions;
    B. Develop an effective corrective action plan for an organization;
    C. Analyze the relationship between facts, analysis and causation;
    D. Describe the facets of hazard control precedence;
    E. Analyze priorities in designing a hazard control solution;
    F. Write a report documenting an accident;
    G. Discuss the importance of corrective actions;
    H. Delineate a time-table for an organization in following corrective actions;
    I. Discuss the importance of follow-up activities for an organization; and
    J. Discuss accident trending and its role in accident prevention.

23. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
    A. The student achieves business and industry employability skills standards such as attendance, on-time arrival, meeting deadlines, working toward personal/team goals every day, and ethical use of technology.

24. The student identifies the relationship between Fire Behavior, the Model Codes, and the Fire Protection Systems. The student is expected to:
    A. describe the difference between fire and combustion; fire triangle and tetrahedron;
    B. list and describe the types of fire, stages of fire;
    C. list and describe the forms of heat transfer and methods used to extinguish fires;
    D. list and describe the classes of fire and their relationship to extinguishing agents;
    E. define the terms code and model code as described by the International Code Council (ICC) model code development process;
    F. describe the difference between the International Code Council (ICC) model code development process and the National Fire Protection Association (NFPA) model code development process;
    G. describe the advantages to governments and organizations that adopt model codes;
    H. list the most important code-related conditions that determine the installation requirements for fire protections systems.

25. The student examines various types and requirements of Fire Alarm System Components and Functions. The student is expected to:
    A. identify and explain the fire alarm system components and functions, types of fire alarms and detection systems;
    B. explain water supplies for fire protection systems, standpipe and hose systems, automatic fire sprinkler systems, and specialized water-based fire protection systems;

26. The student examines Special Hazard Fire Suppression Systems. The student is expected to:
    A. describe the characteristics and hazards of fixed wet and dry chemical extinguishing systems, how they control and extinguish fire, and the acceptance and periodic inspection requirements;
    B. describe the physical characteristics of carbon dioxide, halogenated hydrocarbons (halons), halocarbons, and inert gases (clean agents);
    C. explain the fire extinguisher classification system, different types of fire extinguishers and how they operate, acronym PASS, and the inspection, testing, and maintenance procedures.

27. The student recognizes communication skills needed for Control and Management Systems, Property Security, and Emergency Response. The student is expected to:
    A. use communication skills state the design goals for smoke and fire control and smoke management systems during inspections;
    B. use interpersonal communication skills during emergency response training; and
    C. use writing skills to facilitate documentation requirements during inspections when identifying means of egress.