



## Approved Innovative Course

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Course: Occupational Safety and Environmental Technology (OSET) III

PEIMS Code: N1303682

Abbreviation: OSET3

Grade Level(s): 11-12

Number of Credits: 2.0

### Course description:

During Occupational Safety & Environmental Technology (OSET) III, students will study a variety of national and worldwide health and safety problems, and learn preventative measures to resolve, reduce, and/or eliminate safety and health issues encountered at the workplace. Students will encounter detailed information from various federal agencies that are involved in workplace safety and health and demonstrate understanding of that information. Focus will be on the Occupational Safety and Health Administration (OSHA) regulations and the Department of Transportation (DOT) regulations with an emphasis on identifying and applying appropriate regulatory safety standards. This course will allow students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings.

### Essential knowledge and skills:

Occupational Safety and Environmental Technology (OSET) III- Regulatory Safety Standards (Two Credits).

(a) General Requirements: This course is recommended for students in Grades 11-12.

Prerequisites: OSET I and OSET II. Recommended prerequisite: Chemistry or IPC.

(b) Introduction:

- (1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
- (2) The Manufacturing Career Cluster focuses on planning, managing, and performing the processing of materials into intermediate or final products and



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- related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.
- (3) Students will study a variety of national and worldwide health and safety problems, and learn preventative measures to resolve, reduce, and/or eliminate safety and health issues encountered at the workplace. Students will encounter detailed information from various federal agencies that are involved in workplace safety and health and demonstrate understanding of that information. Focus will be on the Occupational Safety and Health Administration (OSHA) regulations and the Department of Transportation (DOT) regulations with an emphasis on identifying and applying appropriate regulatory safety standards. This course will allow students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems and settings. Students in the OSET III course will participate in work-based learning in the field, including paid or unpaid employment and shadowing opportunities.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.
  - (5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

### (c) Knowledge and skills.

(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:

- (A) identify career development and entrepreneurship opportunities in occupational safety and environmental technology;
- (B) identify careers in occupational safety and environmental technology;
- (C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in occupational safety and environmental technology;
- (D) discuss certification opportunities;
- (E) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills;
- (F) apply fundamental business principles, practices, and metrics such as risk vs reward and organizational responsibility to safety, health, and environmental operations; and



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- (G) explore career goals, objectives, and strategies as part of a plan for future career opportunities.
- (2) The student demonstrates appropriate verbal and written communication skills. The student is expected to:
- (A) employ writing and preparation skills using technical information; and demonstrate speaking skills;
  - (B) discuss and demonstrate principles of public speaking;
  - (C) analyze an intended audience;
  - (D) research, analyze, and organize supporting materials;
  - (E) employ visual aids effectively; and
  - (F) speak effectively in small groups.
- (3) The student identifies hazardous material as it relates to safety, prevention, and possible action plans. The student is expected to:
- (A) analyze chemistry fundamentals essential in the study of hazardous materials, such as recognizing the common elements by their atomic symbols on the periodic table;
  - (B) describe the difference between elements, compounds, and mixtures;
  - (C) explain how ionic and covalent bonding influence chemical properties;
  - (D) summarize the properties of gases, liquids, and solids that are essential in the study of hazardous chemicals;
  - (E) summarize the chemical properties of some common elements, including oxygen, ozone, hydrogen, fluorine, chlorine, phosphorus, sulfur, and carbon regarding industrial purposes and possible chemical hazards;
  - (F) analyze the principles of chemical interactions to emergency response incidents that occur at home, in the workplace, or at public sites;
  - (G) explain the hazard classes as outlined by the Department of Transportation (DOT) and the basic DOT hazardous material regulations related to the identification, classification, labeling, marking, and transporting of hazardous materials and response to hazardous material incidents;
  - (H) summarize key chemical-specific factors or properties that should be considered when managing or responding to incidents involving corrosive materials (acids and bases), water reactive substances,



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pyrophoric materials, toxic substances, oxidizers, organic compounds, and polymeric materials;

(4) The student summarizes the processes of and precautions for handling hazardous materials. The student is expected to:

- (A) demonstrate key elements of safe materials handling and storage;
- (B) analyze the hazards of handling, storing, using, or transporting DOT regulated explosive or radioactive materials;
- (C) analyze the regulations that govern and precautions that should be taken when handling, storing, using, or transporting DOT regulated explosive or radioactive materials;
- (D) explain how to choose and use personal protection equipment (PPE) based upon job safety analyses;
- (E) employ resources such as the DOT Emergency Response Guidebook (ERG) to determine emergency response actions and management techniques to mitigate hazardous material incidents or projects;
- (F) evaluate and use the Global Harmonized System of Classification and Labeling of Chemical Substances (GHS) and the National Fire Protection Association (NFPA) system of identifying potential hazards; and
- (G) analyze the importance of health and safety measures for hazardous materials management.

(5) The student summarizes a range of hazards and appropriate safety responses to hazards. The student is expected to:

- (A) explain how or under what circumstances hazardous materials can be flammable, reactive, explosive or corrosive;
- (B) differentiate multi-hazard exposures;
- (C) estimate hazard levels using proscribed values;
- (D) analyze the concept of "standard of care" as applied to hazardous materials training, planning, and response;
- (E) evaluate the key components for risk assessment and hazard assessment;
- (F) describe how key chemical elements can be used to identify the presence of hazardous materials;



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- (G) summarize the key components for the incident command system as it relates to the management of hazardous materials during an incident;
- (H) evaluate and understand the components of a site safety plan for operations at a hazardous material (hazmat) incident; and
- (I) analyze various types of hazardous waste, the impact of hazardous waste on the environment, and the environmental control and public health remedies needed after exposure to hazardous waste.

(6) The student investigates historical and legislative events that impact the handling hazardous materials in the workplace. The student is expected to:

- (A) evaluate the key legislative, regulatory, and voluntary consensus standards that impact hazmat emergency planning and response operations.
- (B) summarize the challenges and implications of managing hazardous waste materials in America;
- (C) evaluate relevant regulatory compliance requirements in the industrial environment;
- (D) evaluate the efficacy of hazardous waste related mandates and programs;
- (E) evaluate contemporary methods of hazardous waste mitigation and remediation including waste minimization, pollution prevention, reuse, and recycling; and
- (F) evaluate federal and state safety and health policies that are in place for hazardous waste workers.

(7) The student receives and provides workplace health and safety training. The student is expected to:

- (A) obtain and evaluate general information regarding training requirements and updates from local, state, and federal agencies;
- (B) describe the effectiveness of various safety and security of specific trainings;
- (C) explain other training requirements, renewals, or refreshers that may be applicable depending on job specifications;



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- (D) demonstrate competency in training skills such as a mock training;
- (E) explain safety and health training requirements specified by standard setting organizations;
- (F) examine safety and health training theories and their applications;
- (G) develop strategies for communicating safety and health training in the workplace;
- (H) discuss management's role in safety and health training;
- (I) examine methods for assessing safety and health training performance;
- (J) evaluate best practices in safety and health training; and
- (K) evaluate differences in culture and language to provide effective training to workers.
- (8) The student evaluates workplace safety measures from the perspective of management or ownership. The student is expected to:
- (A) recommend improvements to a workplace safety and health program and awareness in a mock setting;
- (B) evaluate safety, health, and environmental risks and hazards in the workplace to modify management responses to workplace safety and health issues;
- (C) discuss important laws, codes, and regulations related to occupational safety and health and the environment with employees in a mock setting;
- (D) perform calculations regarding the measurement of safety, health, and environmental hazards to evaluate and control the hazards in mock settings.;
- (E) explain the role of employee advisory committees and employee health care on the occupational safety and health profession.
- (9) The student explains occupational safety as it relates to transportation systems. The student is expected to:
- (A) evaluate Part 40 of the Federal Motor Carriers Safety Regulations (FMCSR) related to procedures for transportation workplace drug and alcohol testing programs;
- (B) categorize exemptions from requirements of Part 40;



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- (C) analyze forms used to report Management Information System (MIS) data to a DOT agency;
  - (D) discuss the activities of transportation employers, safety-sensitive transportation employees (including self-employed individuals, contractors and volunteers as covered by DOT agency regulations), and service agents;
  - (E) evaluate 49 Code of Federal Regulations (CFR), pertaining to the Department of Transportation;
  - (F) summarize the elements of a fleet safety program;
  - (G) analyze the special considerations of a small fleet;
  - (H) discuss the benefits of driver training and instructions;
  - (I) analyze the responsibilities and duties of driver supervision;
  - (J) examine the components of a motor fleet inspection program;
  - (K) demonstrate the organization of motor fleet accident data;
  - (L) discuss the development of positive motor fleet transportation publicity;
  - (M) explain the components of a school bus safety program; and
  - (N) recognize motor fleet safety and security management techniques.
- (10) The student discusses methods to reduce sources of workplace hazards to promote a safe working environment. The student is expected to:
- (A) describe safe work practices and emergency procedures;
  - (B) analyze rules and laws designed to promote safety and health in the transportation environments;
  - (C) explain the purpose of Section 390 Safety Regulations in relation to the reduction of workplace hazards;
  - (D) discuss Section 390 Subpart B General Requirements and Information in relation to the reduction of workplace hazards;
  - (E) analyze the importance of proactive thinking and accepting responsibility for safety and health for all stakeholders and employees;
  - (F) explain the role of management systems, measurable standards, and metrics as tools for improvement;



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(G) compare a highly effective safety program with positive and vibrant safety culture with one that is lacking;

(H) analyze the importance of safety from a leadership perspective;

(I) demonstrate how lean tools, such as the facilitated Kaizen blitz and A3 problem solving, are applicable to safety;

(J) employ lean tools to establish a safety culture and to ensure continuous improvement;

(K) describe how lean tools can help to investigate and analyze accidents/incidents, and to prevent future occurrences; and

(L) discuss how employees use lean tools to establish a safety culture that consistently meets the state, national, and international health and safety standards as established by those respective governing bodies.

(11) The student demonstrates knowledge and understanding of Occupational Safety and Health Administration rules and regulations. The student is expected to:

(A) assess Occupational Safety and Health Administration (OSHA) rulemaking, enforcement, and adjudication processes;

(B) summarize OSHA's approach to applying the General Duty Clause in enforcement actions;

(C) assess employee rights related to workplace safety;

(D) analyze OSHA citation classifications and related penalties;

(E) outline employer rights and responsibilities following an OSHA inspection;

(F) examine affirmative defenses used to contest alleged violations; and

(G) explain enforcement and the judicial review process of criminal OSHA violations.

*Description of specific student needs this course is designed to meet:*

OSET III provides students an extended and more in-depth learning in the Occupational Safety and Environmental Technology field. Students will have the opportunity to graduate high school workforce ready. Students will gain the knowledge and skills to conduct safety audits and to





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prepare and present safety plans. The emphasis on science also exposes students to a broader STEM perspective, with an innovative view of environmental science and chemistry when dealing with potential hazards

### Major resources and materials:

Oakley, Jeffrey S. *Accident Investigation Techniques*. American Society of Safety Engineers, 2012.  
Reese, Charles D. *Occupational Health and Safety Management: A Practical Approach*. CRC Press, 2016.

### Recommended course activities:

OSET students will create training presentations relating to human and workplace ergonomic hazards with corrective action/recommendations; develop and implement a safety program for a local business industry; utilize monitoring devices while collecting field samples and analyzing samples using proper protocols; draft a safety plan for an industrial setting with multiple management systems.

### Suggested methods for evaluating student outcomes:

Measures of success will be determined from daily participation, class work, projects, exams, work-based learning performance, including service learning projects. Specific activities or projects include but are not limited to:

- Submitting a blog-based assignments regarding management buy-ins and support, decision making, conflict resolutions, safety cultures, and communication barriers
- Submitting assignments replicating Job Action Sheets, workers' compensation, accident investigation, hazards identification, and policy update
- Submitting assignments detailing mock training programs with emergency response

### Teacher qualifications:

- Secondary Industrial Arts (Grades 6-12).
- Secondary Industrial Technology (Grades 6-12).
- Technology Education: Grades 6-12.
- Trade and Industrial Education: Grades 6-12. This assignment requires appropriate work approval.



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- Trade and Industrial Education: Grades 8-12. This assignment requires appropriate work approval.
- Vocational Trades and Industry. This assignment requires appropriate work approval.

### *Additional information:*

Students will have the opportunity to earn the ten-hour general industry OSHA certification in addition to dual credit towards a level I or level II certification and even an associate's degree if partnering with an institution of higher education with an OSET or OSHA program.