Engineered Energy Systems

EES8411 36 weeks

Table of Contents

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Office of Career, Technical, and Adult Education
Virginia Department of Education

Course Description

Suggested Grade Level: 10 or 11
Prerequisite: LC8411

Students will understand how engineered systems provide efficient, safe, and reliable energy. Students design and model energy systems, including those using renewable and non-renewable energy sources. This course will explore the engineering design process, health and safety

standards, supply chain management, and relationships between producers and consumers in the energy sector. Students will also research careers in energy.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

Task Number	EES8411	Tasks/Competencies	
Introducing Energy Systems			
39	⊕	Define *system* and *engineered system*.	
40	⊕	Describe the engineering design process.	
41	⊕	Apply the engineering design process.	
42	⊕	Summarize how energy is captured.	
43	⊕	Compare the engineered systems involved in mining, drilling, and harnessing sources of energy.	
Exploring Applications of Engineered Systems			
44	⊕	Define *turbine* and *generator*.	
45	⊕	Summarize how turbines are used to generate electricity.	
46	⊕	Describe non-turbine electricity generation.	
47	⊕	Summarize how energy is used (aside from electricity).	
48	⊕	Design an energy system for a renewable resource.	
49	⊕	Model a subsystem of an energy system.	
Complying with Safety and Health Standards			
50	⊕	Identify safety and health standards.	
51	⊕	Apply safety standards in the lab.	

52	⊕	Analyze how systems are engineered for safety.	
53	⊕	Model an engineered system for fossil fuel.	
Describing Energy Supply Chain Management			
54	⊕	Define *supply chain* and its importance.	
55	⊕	Diagram a supply chain for an energy system.	
56	⊕	Explain the importance of record keeping.	
Describing Utility/Producer and Consumer Relationships			
57	⊕	Identify the relationship between utilities/producers and consumers.	
58	⊕	Explain how systems affect utility/producer and consumer relationships.	
59	⊕	Simulate a relationship between a utility/producer and a consumer.	
Understanding the Societal Effect of Engineered Systems			
60	⊕	Identify societal effects of engineered systems.	
61	⊕	Analyze environmental, health, and safety considerations of engineered systems.	
62	⊕	Present research of societal effects of an energy system in Virginia.	
Exploring Career Paths in Energy and Engineered Systems			
63	⊕	Identify technical careers in energy and engineered systems.	
64	⊕	Identify supporting careers in energy and engineered systems.	
65	⊕	Research selected career(s) in energy and engineered systems.	

Legend: ⊕Essential ○Non-essential ⊖Omitted

Curriculum Framework

Introducing Energy Systems

Task Number 39

Define *system* and *engineered system*.

Definition

Definition should include

- *system*—comprised of parts that work together to perform a function
- *engineered system*—a collection of components designed to work together efficiently.

Process/Skill Questions

- What engineered systems do we use every day?
- What is *system efficiency*?
- What is e*ngineering*?
- What is *systems thinking*?

ITEEA National Standards

2. The Core Concepts of Technology

TSA Competitive Events

Technology Bowl

Task Number 40

Describe the engineering design process.

Definition

Description may include

- identifying the problem/challenge
- researching the problem/challenge
- establishing the criteria/constraints
- brainstorming solutions
- selecting a solution
- building a model
- creating a prototype
- testing a prototype against criteria
- revising the design
- sharing/presenting the design.

Process/Skill Questions

- Who creates the criteria for a successful product or application?
- What economic considerations are important to this process?
- What is the importance of iteration?
- How are solutions shared?

ITEEA National Standards

9. Engineering Design

TSA Competitive Events

Animatronics

Engineering Design

Flight Endurance

Task Number 41

Apply the engineering design process.

Definition

Application may include a problem or challenge in your school or community.

Process/Skill Questions

- What is a challenge in your school or community?
- Why is it useful to involve end users when problem solving?
- What systems (simple or engineered) are in your school or community?

ITEEA National Standards

11. Apply the Design Process

TSA Competitive Events

Animatronics

Engineering Design

Task Number 42

Summarize how energy is captured.

Definition

Summary should include

- mining (e.g., coal, uranium)
- drilling (e.g., oil, natural gas)
- harnessing (e.g., wind, solar).

Process/Skill Questions

- What are the environmental considerations for each method?
- How are these methods used in the local area? Throughout Virginia?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Prepared Presentation

Task Number 43

Compare the engineered systems involved in mining, drilling, and harnessing sources of energy.

Definition

Comparison should include

- historical approaches
- modern mining and drilling practices
- harnessing methods
- efficiencies
- current and emerging technologies.

Process/Skill Questions

- How can these processes be made more efficient?
- What are examples of historical challenges that lead to innovations?
- What are other ways to capture energy?

ITEEA National Standards

16. Energy and Power Technologies

7. The Influence of Technology on History

TSA Competitive Events

Essays on Technology

Exploring Applications of Engineered Systems

Task Number 44

Define *turbine* and *generator*.

Definition

Definition should include

- *turbine*—a rotary engine actuated by the reaction and/or impulse of a current of fluid (such as water, steam, or air) subject to pressure; usually made with a series of curved vanes on a central rotating spindle
- *generator*—a machine by which mechanical energy is changed into electrical energy.

Process/Skill Questions

- When was the first turbine developed? What was it?
- Why might turbines and generators be required to create electricity?
- What other components are used with a turbine and a generator?

ITEEA National Standards

16. Energy and Power Technologies

TSA Competitive Events

Technology Bowl

Task Number 45

Summarize how turbines are used to generate electricity.

Definition

Summary should include

- steam-driven (e.g., coal, nuclear, biomass)
- gas-driven (e.g., natural gas, compressed air, hydrogen)
- wind

- water (e.g., oceans, pumped storage).

Process/Skill Questions

- How are turbines used in natural gas transmission?
- How do a turbine and generator work together to produce electricity?
- How does the nature of the fluid affect the efficiency of the turbine?
- Why can a turbine never be 100 percent efficient?

ITEEA National Standards

16. Energy and Power Technologies

TSA Competitive Events

Essays on Technology

Task Number 46

Describe non-turbine electricity generation.

Definition

Distinction should include

- solar
- geothermal
- batteries
- diesel generator.

Process/Skill Questions

- What are the differences in efficiency when using or not using a turbine?
- What waste concerns are associated with non-turbine electricity generation?
- How can solar energy provide electricity?

ITEEA National Standards

16. Energy and Power Technologies

TSA Competitive Events

Animatronics

Task Number 47

Summarize how energy is used (aside from electricity).

Definition

Summary should include

- heating
- cooking
- industrial applications
- desalinization
- transportation applications.

Process/Skill Questions

- What is *desalinization*?
- What are some applications in transportation?
- How is natural gas used outside of electricity generation?

ITEEA National Standards

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

6. The Role of Society in the Development and Use of Technology

TSA Competitive Events

Principles of Technology (Virginia only)

Task Number 48

Design an energy system for a renewable resource.

Definition

Design may include

- electrical generation system
- gas system.

Design should include

- source of the energy selected
- system components and subsystems
- system inputs, processes, and outputs.

Process/Skill Questions

- How do inputs and outputs affect a system?
- What are key components and subsystems within an energy system?

ITEEA National Standards

11. Apply the Design Process

2. The Core Concepts of Technology

9. Engineering Design

TSA Competitive Events

Animatronics

Task Number 49

Model a subsystem of an energy system.

Definition

Model may include

- three-dimensional (3D)
- computer-aided design (CAD)
- illustration.

Process/Skill Questions

- What tools are used by professional system modelers?
- How are models tested?

ITEEA National Standards

16. Energy and Power Technologies

2. The Core Concepts of Technology

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Computer-Aided Design (CAD), Engineering

Complying with Safety and Health Standards

Task Number 50

Identify safety and health standards.

Definition

Identification may include but not be limited to

- localities
- permitting
- inspections
- state agencies and organizations
    - Virginia Department of Environmental Quality (DEQ)
    - Virginia Department of Transportation (VDOT)
    - Virginia Department of Mines, Minerals, and Energy (DMME)
    - Virginia's State Corporation Commission (SCC)
    - Virginia Department of Labor and Industry (DOLI)

    - Virginia Occupational Safety and Health (VOSH) Safety Compliance Division
    - Virginia Department of Health (VDH)
- federal agencies and organizations
    - Federal Energy Regulatory Commission (FERC)
    - Rural Utilities Service (RUS)
    - Federal Communications Commission (FCC)
    - Federal Aviation Administration (FAA)
    - U.S. Department of Defense (DOD)
    - U.S. Environmental Protection Agency (EPA)
    - U.S. Nuclear Regulatory Commission (NRC)
    - Occupational Safety and Health Administration (OSHA)
    - Bureau of Ocean Energy Management (BOEM)
    - U.S. Fish and Wildlife Service (FWS)
    - U.S. Forest Service (FS)
    - U.S. Department of Energy (DOE)
    - U.S. Department of Homeland Security (DHS)
    - U.S. Army Corps of Engineers (DHS)
- international organizations
    - North American Electric Reliability Corporation (NERC)
    - International Atomic Energy Agency (IAEA).

Process/Skill Questions

- Why do health and safety standards and regulations exist?
- What is a *control room management plan*?
- Why is it important to have emergency response procedures in place?

ITEEA National Standards

16. Energy and Power Technologies

4. The Cultural, Social, Economic, and Political Effects of Technology

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Task Number 51

Apply safety standards in the lab.

Definition

Application may include

- OSHA regulations
- personal protective equipment (PPE) (e.g., hearing protection, respiration protection, eye protection)lockout/tagout
- radiation safety
- safety data sheets (SDS)
- electrical safety
- first aid (e.g., knowledge of bloodborne pathogens, use of an automated external defibrillator [AED])
- fire protection
- emergency actions.

Process/Skill Questions

- What information may be found on SDS?
- What is the most dangerous thing in the lab?
- What should you do if there is a safety concern in the lab?
- What is meant by *200 percent accountability*?

ITEEA National Standards

16. Energy and Power Technologies

Task Number 52

Analyze how systems are engineered for safety.

Definition

Analysis should include modeling and implementing

- automation
- protective circuitry
- warnings and alarms
- monitoring and control systems
- cybersecurity measures
- containment measures.

Process/Skill Questions

- What is a *safety system*?
- What is a *design review board*?
- Why is cybersecurity an important safety consideration?
- What is *supervisory control and data acquisition (SCADA)*?

ITEEA National Standards

13. Assess the Impact of Products and Systems

2. The Core Concepts of Technology

TSA Competitive Events

Animatronics

Cybersecurity

Task Number 53

Model an engineered system for fossil fuel.

Definition

Model should include use of electronic components and demonstrate concepts such as protective circuitry, warnings and alarms, and should facilitate system monitoring and control.

Process/Skill Questions

- What components can be used as protective devices in an electronic circuit?
- How is monitoring and control simulated?

ITEEA National Standards

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Animatronics

Engineering Design

Describing Energy Supply Chain Management

Task Number 54

Define *supply chain* and its importance.

Definition

Definition should include energy supply chain components across the energy life cycle.

Definition should also include

- supply
- manufacturing
- distribution
- demand.

Process/Skill Questions

- What is the difference between a *supply chain* and a *life cycle*?
- Why is the supply chain important?
- How do supply chain components change according to the system?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Technology Bowl

Task Number 55

Diagram a supply chain for an energy system.

Definition

Diagram should include selecting an energy source and tracing the components of the supply chain across its energy life cycle.

Process/Skill Questions

- How is the supply chain sensitive to changes in inputs?
- What vulnerabilities exist in the supply chain?
- How is a supply chain optimized?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Principles of Technology (Virginia only)

Task Number 56

Explain the importance of record keeping.

Definition

Explanation should include

- safety
- business
- management
- design.

Process/Skill Questions

- What is the importance of manual of change (MOC)?
- What is a bill of materials (BOM)?

- What is the relationship between record keeping and safety? What are critical steps?

ITEEA National Standards

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

9. Engineering Design

Describing Utility/Producer and Consumer Relationships

Task Number 57

Identify the relationship between utilities/producers and consumers.

Definition

Identification may include information concerning

- supply
- demand
- cost
- effects of regulation
- public safety.

Process/Skill Questions

- Who are the local utility producers?
- How are best practices and lessons learned shared?
- How does consumer satisfaction and demand affect utility/producer operations?

ITEEA National Standards

16. Energy and Power Technologies

4. The Cultural, Social, Economic, and Political Effects of Technology

TSA Competitive Events

Technology Bowl

Task Number 58

Explain how systems affect utility/producer and consumer relationships.

Definition

Explanation may include

- monitoring systems (e.g., online dashboards)
- net metering
- analyzing data
- incentives
- reliability systems
- the grid
- energy storage systems.

Process/Skill Questions

- What is *net metering*?
- What is the *grid*? What are its vulnerabilities?
- What is the difference between *analytics* and *analysis*?
- What are s*tatistical process control (SPC)* charts?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Animatronics

Task Number 59

Simulate a relationship between a utility/producer and a consumer.

Definition

Simulation may include

- role play
- model
- diagram
- illustration.

Process/Skill Questions

- What are examples of incentives?
- Why do utilities promote increased consumer conservation?
- What influences customer satisfaction?
- How does the engineering design process apply to utility/producer and consumer relationships?

ITEEA National Standards

16. Energy and Power Technologies

TSA Competitive Events

Debating Technological Issues

Understanding the Societal Effect of Engineered Systems

Task Number 60

Identify societal effects of engineered systems.

Definition

Identification should include the concept that any engineered system affects the world outside of that system. Identification should include

- efficiency
- safety
- health
- environment
- economy
- reliability/availability
- public confidence or perception.

Process/Skill Questions

- How do societal needs drive innovation?
- What are some beneficial impacts of energy systems within society?
- What is energy poverty?
- Who establishes the criteria for an engineered system design? What is the role of the design review board members in evaluating a design?
- What is the importance of stakeholder engagement?

ITEEA National Standards

16. Energy and Power Technologies

4. The Cultural, Social, Economic, and Political Effects of Technology

TSA Competitive Events

Biotechnology Design

Engineering Design

Task Number 61

Analyze environmental, health, and safety considerations of engineered systems.

Definition

Analysis should include

- habitats
- soil quality
- water quality
- air quality
- worker health, safety, and training
- public health and safety
- waste concerns
- concerns related to lack of access to energy.

Process/Skill Questions

- How do engineered systems affect habitats?
- How should waste concerns be addressed? What are steps that energy companies take to mitigate potential negative effects?
- What are some positive effects of engineered systems?

ITEEA National Standards

16. Energy and Power Technologies

4. The Cultural, Social, Economic, and Political Effects of Technology

5. The Effects of Technology on the Environment

6. The Role of Society in the Development and Use of Technology

TSA Competitive Events

Biotechnology Design

Task Number 62

Present research of societal effects of an energy system in Virginia.

Definition

Presentation should include

- workforce
- infrastructure
- site location
- education and training opportunities
- public policies
- economics
- environmental considerations.

Process/Skill Questions

- How are societal effects reflected in constraints to the engineering design process?
- What are the challenges involved with energy systems in the ocean?
- What are considerations for implementing energy innovations (e.g., economic, geographic)?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Exploring Career Paths in Energy and Engineered Systems

Task Number 63

Identify technical careers in energy and engineered systems.

Definition

Identification should include areas such as

- design
- construction
- manufacturing
- maintenance
- operations.

Process/Skill Questions

- What is a *systems analyst*? What do systems analysts do?
- What is the role of a civil engineer in a designed system?
- What is *operations*? What is an *operator*? What do operators do?

ITEEA National Standards

16. Energy and Power Technologies

TSA Competitive Events

Animatronics

Engineering Design

Task Number 64

Identify supporting careers in energy and engineered systems.

Definition

Identification should include areas such as

- accounting
- analytics
- law
- administration
- human resources
- information technologies
- transportation.

Process/Skill Questions

- Why is business important to engineering?
- What are examples of support roles? How are support roles important within the energy industry?
- What are the differences between working in corporate offices and in a field/plant environment?

ITEEA National Standards

16. Energy and Power Technologies

Task Number 65

Research selected career(s) in energy and engineered systems.

Definition

Research should include

- educational preparation
- certifications
- workforce demand and growth
- workforce projections
- salary and benefit projections
- opportunities for advancement
- work environment and work culture
- considerations related to lifestyle and work-life balance.

Process/Skill Questions

- What certifications are available for high school students interested in energy and engineered systems?
- What relevant programs does the local community college offer? Four-year universities in Virginia?
- Why is work-life balance important?
- What role can military service play in preparing a person for a career in the energy industry?
- What energy positions may offer teleworking?

ITEEA National Standards

16. Energy and Power Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Essays on Technology

Extemporaneous Speech

Prepared Presentation

SOL Correlation by Task

39	Define *system* and *engineered system*.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5
40	Describe the engineering design process.	English: 10.5, 11.5, 12.5 Mathematics: AFDA.8, COM.1, PS.8*, PS.10* Science: PH.1, PH.3
41	Apply the engineering design process.	History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14 Science: PH.4
42	Summarize how energy is captured.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14

43	Compare the engineered systems involved in mining, drilling, and harnessing sources of energy.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14
44	Define *turbine* and *generator*.	English: 10.3, 11.3, 12.3
45	Summarize how turbines are used to generate electricity.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14
46	Describe non-turbine electricity generation.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14
47	Summarize how energy is used (aside from electricity).	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, GOVT.15, VUS.14, WG.17, WHII.14
48	Design an energy system for a renewable resource.	English: 10.1, 11.1, 12.1
49	Model a subsystem of an energy system.	English: 10.2, 11.2, 12.2
50	Identify safety and health standards.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: GOVT.7, GOVT.8, GOVT.9, GOVT.14, GOVT.15
51	Apply safety standards in the lab.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.7, GOVT.8, GOVT.9, GOVT.14, GOVT.15
52	Analyze how systems are engineered for safety.	English: 10.5, 11.5, 12.5
53	Model an engineered system for fossil fuel.	English: 10.2, 11.2, 12.2
54	Define *supply chain* and its importance.	English: 10.3, 11.3, 12.3
55	Diagram a supply chain for an energy system.	
56	Explain the importance of record keeping.	English: 10.5, 11.5, 12.5
57	Identify the relationship between utilities/producers and consumers.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.7, GOVT.8, GOVT.9, GOVT.14, GOVT.15
58	Explain how systems affect utility/producer and consumer relationships.	English: 10.5, 11.5, 12.5 Mathematics: DM.4, DM.1*, DM.2*, DM.3*, PS.1*, PS.2*, PS.3*, PS.4*, PS.7*
59	Simulate a relationship between a utility/producer and a consumer.	

60	Identify societal effects of engineered systems.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.7, GOVT.8, GOVT.9, GOVT.14, GOVT.15, VUS.14, WG.17, WHII.14
61	Analyze environmental, health, and safety considerations of engineered systems.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.12, VUS.14, WG.17, WHII.14
62	Present research of societal effects of an energy system in Virginia.	English: 10.1, 11.1, 12.1 History and Social Science: GOVT.9, GOVT.12, VUS.14, WG.17, WHII.14
63	Identify technical careers in energy and engineered systems.	English: 10.5, 11.5, 12.5
64	Identify supporting careers in energy and engineered systems.	English: 10.5, 11.5, 12.5
65	Research selected career(s) in energy and engineered systems.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8

Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Energy Industry Fundamentals Certificate Assessment

Concentration sequences: *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Energy Source Life Cycle (LC8411/36 weeks)

Career Cluster: Energy	
Pathway	**Occupations**
Energy Efficiency	**Electrical Engineer** **Electrician** **Environmental Engineer** **Environmental Engineering Technician** **HVAC and Refrigeration Mechanic or Installer**
Fuels Production	**Chemical Engineer** **Chemist** **Continuous Mining Machine Operator** **First-Line Supervisor of Transportation and Material-Moving Machine and Vehicle Operator** **Petroleum Engineer** **Petroleum Technician** **Service Unit Operator, Oil, Gas, and Mining** **Wellhead Pumper**
Power Generation	**Control and Valve Installer, Repairer** **Electrical Engineering Technician** **Electronics Engineer** **Electronics Engineering Technician** **Engineering Manager** **Health and Safety Engineer** **Mechanical Engineer** **Nuclear Engineer** **Nuclear Power Reactor Operator** **Nuclear Technician** **Solar Photovoltaic Installer**

Career Cluster: Energy	
Pathway	**Occupations**
Transmission and Distribution	**Electrical and Electronics Repairer, Powerhouse, Substation and Relay** **Electrical Power Line Installer/Repairer** **Electro-Mechanical Technician** **Gas Compressor and Gas Pumping Station Operator** **Pipefitter, Steamfitter** **Plumber** **Power Distributor, Dispatcher** **Wind Turbine Service Technician**

Career Cluster: Science, Technology, Engineering and Mathematics	
Pathway	**Occupations**
Engineering and Technology	**Chemical Engineer** **Civil Engineer** **Civil Engineering Technician** **Computer Hardware Engineer** **Computer Programmer** **Computer Software Engineer** **Electrical Drafter** **Electrical Engineer** **Electrical Engineering Technician** **Electro-Mechanical Technician** **Electronic Drafter** **Electronics Engineering Technician** **Engineer** **Engineering Manager** **Engineering Technician** **Mechanical Drafter** **Mechanical Engineer** **Mechanical Engineering Technician** **Network and Computer Systems Administrator** **Network Systems and Data Communication Analyst** **Nuclear Engineer** **Petroleum Engineer** **Pipeline Drafter** **Power Systems Engineer** **Quality Engineer** **Quality Technician** **Statistician** **Systems Analyst** **Transportation Manager**
Science and Mathematics	**Occupational Health and Safety Specialist**

Career Cluster: Transportation, Distribution and Logistics	
Pathway	**Occupations**
Facility and Mobile Equipment Maintenance	**Diesel Service Technician** **Electrical and Electronic Installer** **Electrical and Electronic Repairer**
Health, Safety and Environmental Management	**Health, Safety, and Environment Manager**
Logistics Planning and Management Services	**Logistics Manager**
Transportation Systems/Infrastructure Planning, Management and Regulation	**Civil Engineer** **Civil Engineering Technician**