# Emerging Technologies in Transportation and Logistics

## Course Description

Emerging Technologies in Transportation and Logistics is a course that will introduce students to the application of technologies in the transportation and logistics industries. These areas will include: trucking Industry, railroad Industry, aviation Industry, shipping Industry, and various current and emerging transportation and logistics technologies.

## Course Code: 101601

## Program(s) of Study to which This Course Applies

- Logistics Planning and Management



| Course Framework | Reference Standards | Academic Crosswalk |
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| **Standard 1. Students will explain the different segments of the transportation industry.** | KS - TRBP01.01.02 | [TBD by NDE] |
| Benchmark 1.1 Students will understand the functions of the trucking industry.<br><br>Sample performance indicators:<br>• Identify and explain the different laws and regulation associated with trucking.<br>• Explain and demonstrate the proper use of trailer tandems.<br>• Explain the different types of cargo a truck can carry. | KS - TRBP01.01.02 | [TBD by NDE] |
| Benchmark 1.2 Students will understand the functions of the railroad industry.<br><br>Sample performance indicators:<br>• Identify and explain the different laws and regulations associated with the railroad industry.<br>• Explain what a classification yard is.<br>• Explain how different products are shipped by rail. | KS - TRBP01.01.02 | [TBD by NDE] |
| Benchmark 1.3 Students will understand the functions of the Airline industry. | KS - TRBP01.01.02 | [TBD by NDE] |

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| Sample performance indicators:<br>• Identify and explain the different laws and regulations associated with the airline industry.<br>• Explain what the lift principle is.<br>• Explain the basic controls of an airplane. | | |
| Benchmark 1.4 Students will understand the functions of the Shipping and Marine Transport Industry.<br><br>Sample performance indicators:<br>• Explain what an "intermodal" container is.<br>• Identify the major ports in the United States and across the world. | KS - TRBP01.01.02 | [TBD by NDE] |
| Benchmark 1.5 Students will understand the functions of the oil industry<br><br>Sample performance indicators:<br>• Explain what a commodity is.<br>• Explain what OPEC is and how it functions.<br>• Explain what the Strategic Petroleum Reserve is. | KS - TRBP01.01.02 | [TBD by NDE] |
| **Standard 2. Students will explain the current transportation technologies.** | KS - TRPD01.02.02<br>EPTT | [TBD by NDE] |
| Benchmark 2.1 Students will understand the theory of the four-stroke internal combustion engine.<br><br>Sample performance indicators:<br>• Explain the four-strokes of a combustion engine.<br>• Identify different types of engines.<br>• Compare and Contrast carburetors and fuel injection systems. | KS -TRPD01.02.02<br>EPTT | [TBD by NDE] |
| Benchmark 2.2 Students will understand the theory of the diesel engine.<br><br>Sample performance indicators:<br>• Explain what a glow plug does.<br>• Explain what happens when diesel "gels". | KS - TRPD01.02.02<br>EPTT | [TBD by NDE] |
| Benchmark 2.3 Students will understand the theory of a two-stroke internal combustion engine.<br><br>Sample performance indicators:<br>• Explain the two strokes of two-stroke combustion engine. | KS -TRPD01.02.02<br>EPTT | |

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| • Explain the different uses of a two-stroke combustion engine | | |
| Benchmark 2.4 Students will understand the theory of optional propulsion designs.<br><br>Sample performance indicators:<br>• Explain how a rotary engine works.<br>• Explain the how a diesel-electric locomotive works.<br>• Explain how a jet engine works.<br>• Explain how a hybrid engine. | KS - TRPD01.02.02<br>EPTT | [TBD by NDE] |
| **Standard 3. Students will explain emerging transportation energies and technologies.** | EPTT | [TBD by NDE] |
| Benchmark 3.1 Students will understand the uses and functions of bio fuels.<br><br>Sample performance indicators:<br>• Explain how ethanol is made.<br>• Explain how soy bio diesel is made.<br>• Explain how bio-diesel influences the transportation industry. | EPTT | [TBD by NDE] |
| Benchmark 3.2 Students will understand the uses and functions of electric power.<br><br>Sample performance indicators:<br>• Explain how a motor works.<br>• Explain how electricity is distributed on the grid.<br>• Explain how electricity is produced. | EPTT | [TBD by NDE] |
| Benchmark 3.3 Students will understand the uses and functions of hydrogen.<br><br>Sample performance indicators:<br>• Explain how hydrogen vehicle works.<br>• Explain how hydrogen is produced. | EPTT | [TBD by NDE] |
| Benchmark 3.4 Students will understand the uses and functions of natural gas.<br><br>Sample performance indicators:<br>• Explain how a natural gas vehicles work.<br>• Explain how natural gas is produced. | EPTT | [TBD by NDE] |
| Benchmark 3.5 Students will understand the uses and functions of other alternative energy sources. | EPTT | [TBD by NDE] |

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| Sample performance indicators:<br>• Explain how propane is used in transportation.<br>• Explain how nuclear energy is used to produce electricity. | | |
| **Standard 4. Students will explain current and emerging logistics technologies.** | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |
| Benchmark 4.1 Students will understand the uses and functions of bar codes in logistics.<br><br>Sample performance indicators:<br>• Explain UPC codes.<br>• Demonstrate the operation of Bar Code readers. | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |
| Benchmark 4.2 Students will understand the uses and functions of Radio Frequency Identification (RFID) in logistics.<br><br>Sample performance indicators:<br>• Explain the 4 different parts to an RFID system.<br>• Explain how a RFID system can increase visibility in a warehouse.<br>• Explain how RFID can increase efficiency in a perpetual inventory system. | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |
| Benchmark 4.3 Students will understand the uses and functions of Global Positioning Systems (GPS) in logistics.<br><br>Sample performance indicators:<br>• Explain how triangulation works.<br>• Explain how GPS increases visibility in the supply chain. | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |
| Benchmark 4.4 Students will understand the uses and functions of Geographical Information Systems (GIS) in logistics.<br><br>Sample performance indicators:<br>• Explain how GIS works.<br>• Explain how GIS can increase efficiency in transportation. | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |
| Benchmark 4.5 Students will understand the uses and functions of alternative logistics technologies.<br><br>Sample performance indicators: | KS - BAPE04.01.01<br>KS - BAPE04.01.02 | [TBD by NDE] |

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| • Explore new emerging logistics technologies.<br>• Explain how radar works. | | |

*Reference Standards Sources*

- KS = Career Clusters Knowledge and Skills Statements. Revised 2008. National Career and Technical Education Foundation, Silver Spring, MD. www.careerclusters.org.
- EPTT: Energy, Power, and Transportation Technology.

**Creation date**: July 23, 2010

**Approval date**:

**Revision date** *(if changes made after final draft)*:



## Other Information

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| Suggestions for innovative teaching and learning strategies: | • |
| Related assessments: | • |
| Extended learning opportunities: | • |