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:

Program(s) of Study to which This Course Applies

- Logistics Planning and Management

Course Framework	Reference Standards	Academic Crosswalk
Standard 1. Students will explain the different segments of the transportation industry.	KS - TRBP01.01.02	
Benchmark 1.1 Students will understand the functions of the trucking industry. <u>Sample performance indicators:</u> • Identify and explain the different laws and regulation associated with trucking. • Explain and demonstrate the proper use of trailer tandems. • Explain the different types of cargo a truck can carry.	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 1.2 Students will understand the functions of the railroad industry. <u>Sample performance indicators:</u> • Identify and explain the different laws and regulations associated with the railroad industry. • Explain what a classification yard is. • Explain how different products are shipped by rail.	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 1.3 Students will understand the functions of the Airline industry.	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1)

Sample performance indicators: • Identify and explain the different laws and regulations associated with the airline industry. • Explain what the lift principle is. • Explain the basic controls of an airplane.		LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 1.4 Students will understand the functions of the Shipping and Marine Transport Industry. Sample performance indicators: • Explain what an “intermodal” container is. • Identify the major ports in the United States and across the world.	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 1.5 Students will understand the functions of the oil industry Sample performance indicators: • Explain what a commodity is. • Explain what OPEC is and how it functions. • Explain what the Strategic Petroleum Reserve is.	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Standard 2. Students will explain the current transportation technologies.	KS - TRPD01.02.02 EPTT	
Benchmark 2.1 Students will understand the theory of the four-stroke internal combustion engine. Sample performance indicators: • Explain the four-strokes of a combustion engine. • Identify different types of engines. • Compare and Contrast carburetors and fuel injection systems.	KS -TRPD01.02.02 EPTT	SC12.2.1.b (1) SC12.2.1.c (1) MA12.2.5 (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 2.2 Students will understand the theory of the diesel engine. Sample performance indicators: • Explain what a glow plug does. • Explain what happens when diesel “gels”.	KS - TRPD01.02.02 EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 2.3 Students will understand the theory of a two-stroke internal combustion engine. Sample performance indicators:	KS -TRPD01.02.02 EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)

• Explain the two strokes of two-stroke combustion engine. • Explain the different uses of a two-stroke combustion engine		
Benchmark 2.4 Students will understand the theory of optional propulsion designs. <u>Sample performance indicators:</u> • Explain how a rotary engine works. • Explain the how a diesel-electric locomotive works. • Explain how a jet engine works. • Explain how a hybrid engine.	KS - TRPD01.02.02 EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Standard 3. Students will explain emerging transportation energies and technologies.	EPTT	
Benchmark 3.1 Students will understand the uses and functions of bio fuels. <u>Sample performance indicators:</u> • Explain how ethanol is made. • Explain how soy bio diesel is made. • Explain how bio-diesel influences the transportation industry.	EPTT	SC12.4.3.c (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 3.2 Students will understand the uses and functions of electric power. <u>Sample performance indicators:</u> • Explain how a motor works. • Explain how electricity is distributed on the grid. • Explain how electricity is produced.	EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 3.3 Students will understand the uses and functions of hydrogen. <u>Sample performance indicators:</u> • Explain how hydrogen vehicle works. • Explain how hydrogen is produced.	EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 3.4 Students will understand the uses and functions of natural gas. <u>Sample performance indicators:</u> • Explain how a natural gas vehicles work. • Explain how natural gas is produced.	EPTT	SC12.4.3.c (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)

Benchmark 3.5 Students will understand the uses and functions of other alternative energy sources. Sample performance indicators: • Explain how propane is used in transportation. • Explain how nuclear energy is used to produce electricity.	EPTT	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Standard 4. Students will explain current and emerging logistics technologies.	KS - BAPE04.01.01 KS - BAPE04.01.02	
Benchmark 4.1 Students will understand the uses and functions of bar codes in logistics. Sample performance indicators: • Explain UPC codes. • Demonstrate the operation of Bar Code readers.	KS - BAPE04.01.01 KS - BAPE04.01.02	SC12.2.3.c (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 4.2 Students will understand the uses and functions of Radio Frequency Identification (RFID) in logistics. Sample performance indicators: • Explain the 4 different parts to an RFID system. • Explain how a RFID system can increase visibility in a warehouse. • Explain how RFID can increase efficiency in a perpetual inventory system.	KS - BAPE04.01.01 KS - BAPE04.01.02	SC12.2.3.c (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 4.3 Students will understand the uses and functions of Global Positioning Systems (GPS) in logistics. Sample performance indicators: • Explain how triangulation works. • Explain how GPS increases visibility in the supply chain.	KS - BAPE04.01.01 KS - BAPE04.01.02	MA12.2.2 (1) CCSS: MA(G-MG) (1) LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)
Benchmark 4.4 Students will understand the uses and functions of Geographical Information Systems (GIS) in logistics. Sample performance indicators: • Explain how GIS works.	KS - BAPE04.01.01 KS - BAPE04.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)

• Explain how GIS can increase efficiency in transportation.		
Benchmark 4.5 Students will understand the uses and functions of alternative logistics technologies. <u>Sample performance indicators:</u> • Explore new emerging logistics technologies. • Explain how radar works.	KS - BAPE04.01.01 KS - BAPE04.01.02	LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)

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

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