

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
<p>Standard 1. Students will explain the different segments of the transportation industry.</p>	KS - TRBP01.01.02	
<p>Benchmark 1.1 Students will understand the functions of the trucking industry.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • 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)
<p>Benchmark 1.2 Students will understand the functions of the railroad industry.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • 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)
<p>Benchmark 1.3 Students will understand the functions of the Airline industry.</p>	KS - TRBP01.01.02	LA12.1.5.b (1) LA12.1.6.d (1)

<p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> 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. 		<p>LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Benchmark 1.4 Students will understand the functions of the Shipping and Marine Transport Industry.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Explain what an “intermodal” container is. Identify the major ports in the United States and across the world. 	<p>KS - TRBP01.01.02</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Benchmark 1.5 Students will understand the functions of the oil industry</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Explain what a commodity is. Explain what OPEC is and how it functions. Explain what the Strategic Petroleum Reserve is. 	<p>KS - TRBP01.01.02</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Standard 2. Students will explain the current transportation technologies.</p>	<p>KS - TRPD01.02.02 EPTT</p>	
<p>Benchmark 2.1 Students will understand the theory of the four-stroke internal combustion engine.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Explain the four-strokes of a combustion engine. Identify different types of engines. Compare and Contrast carburetors and fuel injection systems. 	<p>KS -TRPD01.02.02 EPTT</p>	<p>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)</p>
<p>Benchmark 2.2 Students will understand the theory of the diesel engine.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Explain what a glow plug does. Explain what happens when diesel “gels”. 	<p>KS - TRPD01.02.02 EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Benchmark 2.3 Students will understand the theory of a two-stroke internal combustion engine.</p> <p><u>Sample performance indicators:</u></p>	<p>KS -TRPD01.02.02 EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>

<ul style="list-style-type: none"> • Explain the two strokes of two-stroke combustion engine. • Explain the different uses of a two-stroke combustion engine 		
<p>Benchmark 2.4 Students will understand the theory of optional propulsion designs.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • 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. 	<p>KS - TRPD01.02.02 EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Standard 3. Students will explain emerging transportation energies and technologies.</p>	<p>EPTT</p>	
<p>Benchmark 3.1 Students will understand the uses and functions of bio fuels.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how ethanol is made. • Explain how soy bio diesel is made. • Explain how bio-diesel influences the transportation industry. 	<p>EPTT</p>	<p>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)</p>
<p>Benchmark 3.2 Students will understand the uses and functions of electric power.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how a motor works. • Explain how electricity is distributed on the grid. • Explain how electricity is produced. 	<p>EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Benchmark 3.3 Students will understand the uses and functions of hydrogen.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how hydrogen vehicle works. • Explain how hydrogen is produced. 	<p>EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Benchmark 3.4 Students will understand the uses and functions of natural gas.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how a natural gas vehicles work. • Explain how natural gas is produced. 	<p>EPTT</p>	<p>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)</p>

<p>Benchmark 3.5 Students will understand the uses and functions of other alternative energy sources.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how propane is used in transportation. • Explain how nuclear energy is used to produce electricity. 	<p>EPTT</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>
<p>Standard 4. Students will explain current and emerging logistics technologies.</p>	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	
<p>Benchmark 4.1 Students will understand the uses and functions of bar codes in logistics.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain UPC codes. • Demonstrate the operation of Bar Code readers. 	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	<p>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)</p>
<p>Benchmark 4.2 Students will understand the uses and functions of Radio Frequency Identification (RFID) in logistics.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • 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. 	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	<p>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)</p>
<p>Benchmark 4.3 Students will understand the uses and functions of Global Positioning Systems (GPS) in logistics.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how triangulation works. • Explain how GPS increases visibility in the supply chain. 	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	<p>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)</p>
<p>Benchmark 4.4 Students will understand the uses and functions of Geographical Information Systems (GIS) in logistics.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Explain how GIS works. 	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>



<ul style="list-style-type: none"> Explain how GIS can increase efficiency in transportation. 		
<p>Benchmark 4.5 Students will understand the uses and functions of alternative logistics technologies.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> Explore new emerging logistics technologies. Explain how radar works. 	<p>KS - BAPE04.01.01 KS - BAPE04.01.02</p>	<p>LA12.1.5.b (1) LA12.1.6.d (1) LA12.1.6.f (1) LA12.2.2.c (1)</p>

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

<p>Suggestions for innovative teaching and learning strategies:</p>	<ul style="list-style-type: none">
<p>Related assessments:</p>	<ul style="list-style-type: none">
<p>Extended learning opportunities:</p>	<ul style="list-style-type: none">