Logistics Engineering

PEIMS Code: N1303801
Abbreviation: LOGENG
Grade Level(s): 11–12
Award of Credit: 1.0

Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to TAC §74.13 for guidance on endorsements.

Course Description:

The purpose of the *Logistics Engineering* course is to prepare students for supply chain management (SCM) and logistics professions and required certifications/post-secondary education requirements for each. The main goal of this course is to provide a pathway for high school students to learn core competencies as identified by the local SCM and logistics industry and post-secondary institutions. The central focus of the *Logistics Engineering* course is to provide instruction which can lead to various workforce-preparation degree programs that support employment in the manufacturing, transportation, distribution, supply chain management and logistics industries.

Essential Knowledge and Skills:

(a) General Requirements. This course is recommended for students in grades 11-12. Recommended prerequisites: Principles of Distribution and Logistics and Distribution and Logistics. Students shall be awarded a one credit for successful completion of this course.

(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 Transportation, Distribution, and Logistics (TDL) Career Cluster focuses on careers in planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

(3) In the Logistics Engineering course, students will learn to direct or coordinate production, purchasing, warehousing, distribution, and financial forecasting services or activities to limit costs and improve accuracy, customer service, and

safety. Students will learn about the opportunities available, with various levels of education and training, in industries using logistics engineering.

(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) demonstrate skills related to health and safety in the workplace as specified by appropriate governmental regulations;

(B) demonstrate the standards required in the workplace such as interviewing skills, flexibility, willingness to learn new skills and acquire knowledge, self-discipline, self-worth, positive attitude, and integrity in a work situation;

(C) collaborate with others to solve problems;

(D) identify employers' work expectations; and

(E) evaluate and apply various time-management techniques to develop a work schedule.

(2) The student knows common definitions, terminology, and foundations related to supply chain management and logistics engineering. The student is expected to:

(A) describe the industries using logistics engineering, and identify fields related to logistics engineering;

(B) describe the career opportunities in engineering, pathways including job responsibilities, typical work schedules, and career opportunities;

(C) describe career development, and certification requirements for industries using logistics engineering;

(D) demonstrate the use of content, such as technical concepts and vocabulary, when analyzing information and following directions;

(E) identify currently emerging issues in logistics engineering; and

(F) discuss the history of logistics and its application to production systems.

(3) The student explains the principles and theory of logistics engineering. The student is expected to:

(A) describe warehouse flow and operations;

(B) explain the various concepts related to warehouse operations including picking, slotting, cross-docking, and warehouse automation and technology;

(C) discuss performance metrics used to measure warehouse efficiency;

(D) discuss the foundational role of logistics as it relates to transportation and warehousing;

(E) describe the principles of transportation;

(F) analyze and compare the methods for moving people or goods by air, rail, pipeline, sea, or road, including the relative costs and benefits of each mode;

(G) discuss the stages of production and processing; and

(H) explain the types of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

(4) The student analyzes of the influence of business functions on the logistics function of an organization. The student is expected to:

(A) summarize business and management principles involved in strategic planning, operational budgets and resource allocation, human resources planning, leadership techniques, production methods, and coordination of people and resources;

(B) apply economic and accounting principles and practices for effective organizational practices; and

(C) analyze principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

(5) The student evaluates the importance and impact of customer-centricity in logistics and supply chain management. The student is expected to:

(A) explain the processes for providing customer and personal services including customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction; and

(B) demonstrate methods for showing, promoting, and selling products or services including marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

(6) The student applies industrial mathematics skills. The student is expected to:

(A) perform common computations required in logistics engineering using mastered calculator skills; and

(B) demonstrate how exponents, symbols, and the order of operations are used to solve real world word problems.

(7) The student applies knowledge of various logistics-related concepts using computer technology. The student is expected to:

(A) use and apply computer-based supply chain optimization tools;

(B) explain how enterprise resource planning can be completed using current technology such as Microsoft Dynamics, Oracle Hyperion, Systems, Applications, Products (SAP); and

(C) explain the need and importance of software solutions such as Oracle Inventory, Infor Lawson Supply Chain Management, Swisslog Warehouse Manager for efficient decision making in inventory management and logistics.

(8) The student applies concepts of critical thinking and problem solving. The student is expected to:

(A) analyze elements of a problem to develop solutions;

(B) critically analyze information to determine value to the problem-solving task;

(C) analyze a variety of problem-solving strategies and critical-thinking skills; and

(D) conduct technical research to gather information necessary for decision making.

(9) The student presents conclusions, research findings, and designs using a variety of media. The student is expected to:

(A) discuss and critique the validity of conclusions supported by the data through various methods, such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports; and

(B) record, express, and change relationships among data, using graphs, charts, and equations.

Recommended Resources and Materials:

"Supply Chain Management: A Logistics Perspective," by John Coyle, C. Langley, R. Novack, and B. Gibson, 10th Edition, Cengage Learning/South-Western, 2017.

"Supply Chain Logistics Management" by Donald Bowersox, D. Closs, and M. Bixby Cooper, 5th Edition, McGraw-Hill Education, 2019.

Recommended Course Activities:

- Study-guides by topic (ex: The Supply Chain Concept)
- In-class case study senarios (ex: calculate transportation costs for two alternatives and justifying a decision)
- Individual research presentations (ex: present a logistics activity detailing its role in the supply chain)
- In-class team project research (ex: develop a sourcing strategy and research at least three suppliers for a new product line)
- Team project presentation (ex: present the sourcing strategy and recommendation for a primary supplier)

Suggested methods for evaluating student outcomes:

- Written papers
- Written tests
- Individual oral presentations and reports
- Case studies
- Team research presentations
- Technology-based reports
- Results from simulator reports

Teacher qualifications:

An assignment for Logistics Engineering is allowed with one of the following certificates.

- Technology Education: Grades 6-12.

- Trade and Industrial Education: Grades 6-12. This assignment requires appropriate work approval.
- 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:

It is recommended for the educators of this course to seek industry certifications relevant to Logistics and Supply Chain Management, such as Manufacturing Skill Standards Council (MSSC) Certified Logistics Associate (CLA)/Certified Logistics Technician (CLT)/Certified Production Technician (CPT) and/or American Production and Inventory Control Society (APICS) Certified in Production and Inventory Management (CPIM)/Certified Supply Chain Professional (CSCP)/Certified in Logistics, Transportation and Distribution (CLTD).

Costs associated with above training can be accessed at https://www.msscusa.org/certification/ and http://www.apics.org/credentials-education.