Texas CTE

Transportation, Distribution, and Logistics (2010): Grades 11, 12

Adopted 2010

Principles of Transportation, Distribution, and Logistics

(1) The student explores the employability characteristics for success. The student is expected to:

(A) identify career development and entrepreneurship opportunities in transportation, distribution, and logistics such as how to search for and obtain employment, the qualifications that are required for varying career fields, and how to advance in a position;

(B) identify careers in transportation, distribution, and logistics systems;

(C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in transportation, distribution, and logistics;

(D) discuss certification opportunities;

(E) demonstrate knowledge of personal and occupational health and safety;

(F) discuss response plans to emergency situations;

(G) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and

(H) explore career goals, objectives, and strategies as part of a plan for future career opportunities.

(2) The student develops leadership experience as it relates to transportation, distribution, and logistics systems. The student is expected to:

(A) plan, propose, conduct, and evaluate industry-based occupational experiences;

(B) apply proper record-keeping skills as they relate to industry-based occupational experiences;

(C) use a customized record-keeping system for the individual industry-based occupational experiences;

(D) discuss youth leadership opportunities to create a well-rounded industry-based occupational experience; and

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(E) develop a work plan and budget.

(3) The student explores concepts related to cultural diversity. The student is expected to:

(A) identify significant similarities and differences in international culture;

(B) explain the variety of world markets; and

(C) describe marketing factors and practices that impact other cultures.

(4) The student understands the historical, current, and future significance of the transportation, distribution, and logistic industries. The student is expected to:

(A) define terms associated with the transportation, distribution, and logistics industries;

(B) identify the scope and effect upon society of the transportation, distribution, and logistics industries;

(C) identify significant historical and current developments in the transportation, distribution, and logistics industries;

(D) identify potential future scenarios for the transportation, distribution, and logistics industry systems;

(E) describe how emerging technologies and globalization impact the transportation, distribution, and logistics industries; and

(F) compare and contrast issues affecting the transportation, distribution, and logistics industries such as international trade, employment, safety, and environmental issues.

(5) The student analyzes the structure of transportation, distribution, and logistics organizations. The student is expected to:

(A) describe common business management principles;

(B) identify opportunities for leadership development and personal growth;

(C) demonstrate democratic principles in conducting effective meetings;

(D) describe team dynamics; and

(E) describe the development of organizational vision, mission, and goals through the strategic planning process.

(6) The student explains the transportation, distribution, and logistics industries at the local, state, national, and international levels. The student is expected to:

(A) identify reasons for world trade and globalization;

(B) identify the political impact of transportation, distribution, and logistics;

(C) review regulations and major laws to evaluate their impact on transportation, distribution, and logistics;

(D) read appropriate written material to stay abreast of current issues impacting transportation, distribution, and logistics;

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(E) collect public opinion and data in order to make informed decisions;

(F) use critical-thinking skills to identify and organize alternatives and evaluate public policy issues related to transportation, distribution, and logistics; and

(G) evaluate performance and contract compliance of contractors and service providers.

(7) The student demonstrates appropriate personal and communication skills. The student is expected to:

(A) examine workplace ethical and legal responsibilities;

(B) define the uses of proper etiquette;

(C) identify appropriate personal appearance and health habits;

(D) practice written and oral communication skills in formal and informal situations;

(E) practice effective listening skills in formal and informal situations;

(F) read and comprehend materials common to the transportation industry;

(G) employ writing and preparation skills using technical information; and

(H) demonstrate speaking skills.

(8) The student applies appropriate research methods for transportation, distribution, and logistics systems. The student is expected to:

(A) define major fields of research and development;

(B) identify and apply scientific methods of research in transportation, distribution, and logistics industries;

(C) use a variety of resources for research and development; and

(D) describe the scientific methods of research.

(9) The student applies problem-solving, mathematical, and organizational skills in order to maintain financial and logistical records. The student is expected to:

(A) discuss project proposals;

(B) maintain records appropriate to transportation, distribution, and logistics system industries;

(C) collect and organize data in graphs, tables, charts, and plots; and

(D) analyze and interpret data from graphs, tables, charts, and plots.

(10) The student uses information technology tools specific to transportation, distribution, and logistics industries to access, manage, integrate, and create information. The student is expected to:

(A) use management software, email applications, and Internet applications;

(B) demonstrate word-processing, database, spreadsheet, and presentation software;

(C) examine collaborative, groupware, and virtual meeting software;

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(D) discuss Geographic Information Systems and Global Positioning Systems; and

(E) discuss other computer-based equipment in transportation, distribution, and logistics systems.

(11) The student discusses methods to reduce sources of workplace hazards in order to promote a safe working environment. The student is expected to:

(A) discuss safe work practices and emergency procedures;

(B) identify rules and laws designed to promote safety and health in the transportation, distribution, and logistics environments;

(C) demonstrate first aid and cardiopulmonary resuscitation procedures; and

(D) demonstrate proper use of safety equipment.

(12) The student examines material handling in warehouses and distribution centers. The student is expected to:

(A) discuss handling practices for goods and materials;

(B) explain size, weight, and shape requirements for packaging;

(C) discuss material handling, storage, and shipping methods;

(D) analyze visual design and appearance requirements for packages;

(E) discuss layout plans for processing packages;

(F) identify material handling and storage equipment; and

(G) identify types of warehouses and distribution centers.

Energy, Power, and Transportation Systems

(1) The student knows the employability characteristics that lead to success. The student is expected to:

(A) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(B) identify employers' expectations and appropriate work habits;

(C) identify career development and entrepreneurship opportunities in the energy, power, and transportation systems, including how to search for and obtain employment and what qualifications are required for varying career fields;

(D) identify employment opportunities, including entrepreneurship, and certification requirements for the field of energy, power, and transportation systems;

(E) discuss certification opportunities to meet state academic standards and qualifications for employment in selected fields of study;

(F) apply ethical reasoning to a variety of workplace scenarios in order to make ethical decisions;

(G) apply competencies related to resources, information, systems, and technology;

(H) identify opportunities for leadership development and personal growth;

(I) describe team dynamics; and

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(J) demonstrate effective oral and written communication skills with individuals from varied cultures.

(2) The student knows the functions and applications of the tools, equipment, technologies, and materials used in energy, power, and transportation systems. The student is expected to:

(A) discuss the safe use of hand and power tools and equipment commonly used in the maintenance and repair of engines; and

(B) discuss the use of audits and inspections to maintain compliance with safety, health, and environmental regulations.

(3) The student applies technical knowledge and skills to simulated situations. The student is expected to:

(A) identify the major components in a vehicular system;

(B) identify necessary maintenance and service of vehicle systems; and

(C) discuss preventative maintenance plans and systems to keep vehicular systems in operation.

(4) The student describes the historical, current, and future significance of the energy, power, and transportation systems. The student is expected to:

(A) identify the scope and effect upon society of the energy, power, and transportation systems; and

(B) identify potential future scenarios for the energy, power, and transportation systems.

(5) The student uses academic skills to document the requirements of energy, power, and transportation systems. The student is expected to:

(A) demonstrate communication skills in relation to customers, technicians, and others;

(B) prepare documentation such as quotes, invoices, bills of laden, work orders, and other reports;

(C) read and interpret appropriate documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins;

(D) perform precision measurements to diagnose component shape and alignment, based on industry specifications, and determine necessary repair;

(E) use critical-thinking skills and structured problem-solving skills to diagnose vehicular system malfunctions, solve problems, and make decisions; and

(F) demonstrate knowledge of regulations that govern the construction, maintenance, and service of energy, power, and transportation systems.

Aircraft Technology

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

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(A) identify employment opportunities, including entrepreneurship, and certification requirements for the field of aircraft services;

(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(C) identify employers' expectations and appropriate work habits;

(D) discuss the competencies related to resources, information, systems, and technology;

(E) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace, as specified by appropriate government regulations; and

(F) apply reasoning skills to a variety of workplace situations in order to make ethical decisions.

(2) The student relates academic skills to the requirements of aircraft services. The student is expected to:

(A) demonstrate effective oral and written communication skills with individuals from varied cultures such as fellow workers, management, and customers;

(B) complete work orders and related paperwork;

(C) estimate parts and labor costs on aircraft repair orders;

(D) locate, read, and interpret documents such as schematics, charts, graphs, drawings, blueprints, service-repair manuals and service bulletins, airworthiness directives, and federal aviation regulations;

(E) perform precision measurements to diagnose component wear, compare to published specifications, and determine necessary repair; and

(F) employ critical-thinking skills and structured problem-solving skills to diagnose aircraft system malfunctions, solve problems, and make decisions.

(3) The student knows the technical knowledge and skills of aircraft services. The student is expected to:

(A) demonstrate knowledge of aviation regulations that govern the construction, maintenance, and service of aircraft;

(B) demonstrate knowledge of aircraft navigation and electronic communication systems;

(C) demonstrate knowledge of airframe construction and repair methods and techniques;

(E) demonstrate knowledge of the service and maintenance of aircraft engines, systems, and components;

(D) demonstrate knowledge of aircraft assembly and rigging procedures;

(F) demonstrate knowledge of aircraft common terminology, standard practices, and the proper use of tools required to complete maintenance, modifications, and repairs;

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(G) discuss the completion of logbooks and computer applications to maintain required aircraft documents; and

(H) demonstrate knowledge of wiring diagrams.

(4) The student knows the function and application of the tools, equipment, technologies, and materials used in aircraft services. The student is expected to:

(A) identify and select materials and processes used in aircraft maintenance;

(B) safely use hand and power tools and equipment commonly employed in the maintenance and repair of aircraft;

(C) discuss the proper handling and disposal of environmentally hazardous materials used in servicing aircraft;

(D) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations; and

(E) demonstrate knowledge of new and emerging aircraft technologies.

(5) The student applies the technical knowledge and skills of the trade to simulated and actual work situations. The student is expected to:

(A) accurately calculate aircraft weight and balance;

(B) predict flight time and fuel consumption;

(C) predict wind vector, drift, headings, and speed from meteorological information;

(D) perform required aircraft airframe, instrument, and engine inspections;

(E) demonstrate knowledge of aircraft hydraulic and landing gear systems and components;

(F) apply the essential knowledge and skills in aircraft services to work-based learning experiences such as cooperative education, job shadowing, mentoring, and apprenticeship training; and

(G) discuss preventative maintenance plans and systems to keep aircraft systems in operation.

(6) The student demonstrates appropriate personal and communication skills. The student is expected to:

(A) describe and apply ethical and legal responsibilities appropriate to the workplace;

(B) demonstrate the uses of proper etiquette and behavior;

(C) identify benefits of personal appearance and health habits;

(D) practice written and oral communication skills; and

(E) employ effective listening skills.

(7) The student learns the value of and how to develop an improved occupational experience program as it relates to the aircraft industry. The student is expected to:

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(A) apply proper record-keeping skills as related to industry-based occupational experiences;

(B) participate in youth leadership opportunities to create a well-rounded occupational experience;

(C) produce a program of activities for a career and technical student organization or other leadership opportunities; and

(D) develop a work plan and budget.

Advanced Aircraft Technology

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) discuss employment opportunities, including entrepreneurship, and certification requirements for the field of aircraft services;

(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(C) evaluate employers' expectations and appropriate work habits;

(D) apply the competencies related to resources, information systems, and technology;

(E) demonstrate knowledge of the technology and skills related to health and safety in the workplace, as specified by appropriate government regulations; and

(F) apply reasoning to a variety of workplace situations in order to make ethical decisions.

(2) The student relates academic skills to the requirements of aircraft services. The student is expected to:

(A) demonstrate effective oral and written communication skills with individuals from varied cultures, including fellow workers, management, and customers;

(B) access work orders and related paperwork;

(C) estimate parts and labor costs on aircraft repair orders;

(D) locate, read, and interpret documents such as schematics, charts, graphs, drawings, blueprints, service-repair manuals and service bulletins, airworthiness directives, and federal aviation regulations;

(E) perform precision measurements to diagnose component wear, compare to published specifications, and determine correct replacement parts; and

(F) employ critical-thinking skills and structured problem-solving skills to diagnose aircraft system malfunctions, solve problems, and make decisions.

(3) The student knows the technical knowledge and skills of aircraft services. The student is expected to:

(A) research aviation regulations that govern the construction, maintenance, and service of aircraft;

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(B) diagnose and repair aircraft navigation and electronic communication systems;

(C) demonstrate airframe construction and repair methods and techniques;

(D) demonstrate aircraft assembly and rigging procedures; and

(E) demonstrate service and maintenance of aircraft engines, systems, and components.

(4) The student knows the function and application of the tools, equipment, technologies, and materials used in aircraft services. The student is expected to:

(A) identify and select basic materials and processes used in aircraft maintenance;

(B) safely use hand and power tools and equipment commonly employed in the maintenance and repair of aircraft;

(C) discuss the proper handling and disposal of environmentally hazardous materials used in maintaining and servicing aircraft; and

(D) demonstrate the application of new and emerging aircraft technologies.

(5) The student applies the technical knowledge and skills of the trade to simulated and actual work situations. The student is expected to:

(A) accurately calculate aircraft weight and balance;

(B) predict flight time and fuel consumption;

(C) predict wind vector, drift, headings, and speed from meteorological information;

(D) perform required aircraft airframe, instrument, and engine inspections;

(E) service and repair aircraft hydraulic and landing gear systems and components;

(F) apply the essential knowledge and skills in aircraft services to learning experiences such as job shadowing, mentoring, apprenticeship training, and career preparation;

(G) develop preventative maintenance plans and systems to keep aircraft systems in operation; and

(H) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.

Automotive Technology

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify employment opportunities, including entrepreneurship, and certification requirements for the field of automotive services;

(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(C) identify employers' expectations and appropriate work habits;

(D) apply the competencies related to resources, information, systems, and technology;

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(E) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace, as specified by appropriate government regulations; and

(F) discuss ethics in a variety of workplace scenarios.

(2) The student relates academic skills to the requirements of automotive services. The student is expected to demonstrate effective oral and written communication skills with individuals from varied cultures such as fellow workers, management, and customers.

(3) The student knows the technical knowledge and skills that form the knowledge of automotive services. The student is expected to:

(A) describe the function of the major components of powered vehicles such as engines, fuel, lubrication, cooling, electrical, and air conditioning systems;

(B) describe the function of the automotive chassis components such as braking, steering, transmission, drivetrain, and suspension systems;

(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins;

(D) perform precision measurements to diagnose component wear, compare to published specifications, and determine necessary repair; and

(E) discuss alternative fuel vehicles.

(4) The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive services. The student is expected to:

(A) safely use hand and power tools and equipment commonly employed in the maintenance and repair of vehicles;

(B) discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles;

(C) demonstrate knowledge of new and emerging automotive technologies; and

(D) identify diagnostic tools and equipment.

(5) The student applies the technical knowledge and skills of the trade-to-work situations. The student is expected to:

(A) order, stock, and locate parts;

(B) remove, repair, and replace engine components;

(C) service and repair braking, steering, and suspension systems;

(D) service and repair electrical and electronic systems;

(E) service and repair air-conditioning, heating, and accessory systems;

(F) inspect, service, and repair chassis and power train components and systems;

(G) service and repair cooling and lubrication systems; and

(H) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.

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Advanced Automotive Technology

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify employment opportunities, including entrepreneurship, and certification requirements for the field of automotive service;

(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(C) identify employers' expectations and appropriate work habits;

(D) apply the competencies related to resources, information, systems, and technology;

(E) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace, as specified by appropriate government regulations;

(F) discuss ethics in a variety of workplace situations;

(G) prepare a resumé; and

(H) demonstrate job interview skills.

(2) The student relates core academic skills to the requirements of automotive service. The student is expected to:

(A) complete repair orders and related paperwork; and

(B) estimate parts and labor costs on repair orders.

(3) The student knows the technical knowledge and skills that form the core of knowledge of automotive service. The student is expected to:

(A) diagnose and repair the major components of powered vehicles;

(B) diagnose and repair automotive chassis and driveline components;

(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins;

(D) perform precision measurements to diagnose component wear, compare to published specifications, and determine necessary repair;

(E) employ critical-thinking skills and structured problem-solving skills to diagnose vehicle malfunctions, solve problems, and make decisions; and

(F) discuss alternative fuel vehicles.

(4) The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive service. The student is expected to:

(A) safely use hand and power tools and equipment commonly employed in the maintenance and repair of vehicles;

(B) discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles;

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(C) discuss new and emerging automotive technologies; and

(D) demonstrate proper use of diagnostic tools and equipment.

(5) The student applies the technical knowledge and skills of the trade to simulated or actual work situations. The student is expected to:

(A) perform regular audits and inspections;

(B) discuss ordering, stocking, and locating parts;

(C) analyze malfunctions and remove, repair, and replace engine components;

(D) diagnose, service, and repair braking, steering, and suspension systems;

(E) test, diagnose, service, and repair automotive electrical and electronic systems;

(F) diagnose, service, and repair air-conditioning, heating, and accessory systems;

(G) diagnose, service, and repair chassis and power train components and systems;

(H) test, diagnose, service, and repair air, fuel, ignition, emissions, and drive systems; and

(I) test, diagnose, service, and repair cooling and lubrication systems.

Collision Repair and Refinishing

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify employment opportunities, including entrepreneurship, and certification requirements for the fields of collision repair and refinishing;

(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(C) identify employers' expectations and appropriate work habits;

(D) review the competencies related to resources, information, systems, and technology;

(E) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace, as specified by appropriate regulations; and

(F) apply reasoning skills to a variety of workplace situations in order to make ethical decisions.

(2) The student relates core academic skills to the requirements of collision repair and refinishing services. The student is expected to:

(A) demonstrate effective oral and written communication skills with individuals from varied cultures such as fellow workers, management, and customers;

(B) complete collision repair and refinishing orders and related paperwork;

(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins; and

(D) demonstrate mathematical competencies required to use and interpret service repair manuals.

(3) The student knows the technical knowledge and skills that form the core knowledge of collision repair and refinishing services. The student is expected to:

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(A) demonstrate the types of repair procedures for the different types of vehicle body constructions;

(B) demonstrate the proper preparation, application, and refinishing of various paint products;

(C) estimate parts and labor costs on collision repair and refinishing orders; and

(D) perform precision measurements to diagnose component shape and alignment.

(4) The student knows the function and application of tools, equipment, technologies, and materials used in collision repair and refinishing services. The student is expected to:

(A) use hand and power tools and equipment commonly employed in collision repair and refinishing safely to industry standards;

(B) identify proper welding and cutting techniques and processes;

(C) properly handle and dispose of environmentally hazardous materials used in collision repair and refinishing technologies; and

(D) demonstrate knowledge of new and emerging collision repair and refinishing technologies.

(5) The student applies the technical knowledge and skills of collision repair and refinishing to simulated or actual work situations. The student is expected to:

(A) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations;

(B) identify types of vehicle construction materials and associated repair methods;

(C) identify methods of collision energy management and types of damage;

(D) determine vehicle damage and prepare an estimate of the repair costs;

(E) determine body panel damage and identify the associated repair methods;

(F) identify types of vehicle finishes and associated refinish techniques;

(G) identify vehicle occupant restraint systems and associated repair methods;

(H) identify vehicle body components and repair or replace considerations;

(I) demonstrate the welding and cutting processes used in vehicle collision repair;

(J) remove, install, and adjust vehicle mechanical and electrical components;

(K) identify and determine the cause of paint and refinishing defects;

(L) discuss interior and exterior trim repair;

(M) discuss corrosion protection; and

(N) demonstrate vehicle detailing.

Advanced Collision Re

(1) The student knows the employability characteristics of a successful worker in the modern workplace. The student is expected to:

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(A) identify employment opportunities, including entrepreneurship, and certification requirements for the field of collision repair and refinishing technologies;

(B) examine the principles of group participation and leadership related to citizenship and career preparation;

(C) evaluate employers' expectations and appropriate work habits;

(D) apply the competencies related to resources, information, systems, and technology;

(E) demonstrate advanced knowledge of the technical knowledge and skills related to health and safety in the workplace, as specified by appropriate government regulations;

(F) apply reasoning skills to a variety of workplace situations in order to make ethical decisions;

(G) prepare a resumé; and

(H) demonstrate job interview skills.

(2) The student relates academic skills to the requirements of collision repair and refinishing services. The student is expected to:

(A) demonstrate effective oral and written communication skills with individuals from varied cultures such as fellow workers, management, and customers;

(B) evaluate completed collision repair and refinishing orders and related paperwork; and

(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins.

(3) The student knows advanced technical knowledge and skills that form the core knowledge of collision repair and refinishing services. The student is expected to:

(A) demonstrate the types of repair procedures for the different types of vehicle body constructions;

(B) access the proper preparation, application, and refinishing of paint products, decals, and adhesives;

(C) defend the estimated parts and labor costs on collision repair and refinishing technology orders; and

(D) perform precision measurements to diagnose component shape and alignment, compare to published specifications, and determine necessary repair.

(4) The student knows the function and application of tools, equipment, technologies, and materials used in collision repair and refinishing services. The student is expected to:

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(A) use hand and power tools and equipment commonly employed in collision repair and refinishing technologies according to industry safety standards;

(B) demonstrate proper welding and cutting techniques and processes;

(C) properly handle and dispose of environmentally hazardous materials used in collision repair and refinishing technologies; and

(D) discuss new and emerging collision repair and refinishing technologies.

(5) The student applies the advanced technical knowledge and skills to simulated and actual work situations in collision repair and refinishing. The student is expected to:

(A) analyze audits and inspections to maintain compliance with safety, health, and environmental regulations;

(B) inspect, straighten, and align vehicle frames and replace damaged body units;

(C) inspect and repair damaged sheet metal panels, fiberglass, and synthetic body parts;

(D) inspect, repair, and adjust vehicle body parts;

(E) remove and install vehicle glass and accompanying mechanical and automated parts;

(F) determine body panel damage and demonstrate the associated repair methods;

(G) determine vehicle structural damage and demonstrate the associated repair methods;

(H) determine the type of vehicle finish and demonstrate the associated preparation and refinish techniques;

(I) determine the type of vehicle finish and demonstrate paint selection, mixing, matching, and application;

(J) demonstrate paint application finishing and final detailing;

(K) apply recognized welding and cutting processes used in vehicle collision repair;

(L) identify the cause of paint and refinishing defects;

(M) demonstrate interior and exterior trim repair;

(N) demonstrate corrosion protection methods; and

(O) demonstrate vehicle detailing.

Small Engine Technology

(1) The student explores the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify career development and entrepreneurship opportunities in the small engine technology industry, including how to search for and obtain employment, what qualifications are required for varying career fields, and how to advance in a position;

(B) identify careers in the small engine technology industry;

(C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the small engine technology industry;

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(D) demonstrate knowledge of personal and occupational safety, health, and first-aid policies in the workplace;

(E) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and

(F) explore career objectives and strategies to develop a plan for future career and educational goals.

(2) The student learns the value of and how to develop an improved occupational experience program as it relates to the small engine technology industry. The student is expected to:

(A) apply proper record-keeping skills as related to industry-based occupational experiences;

(B) participate in youth leadership opportunities to create a well-rounded occupational experience;

(C) produce a program of activities for a career and technical student organization or other leadership opportunities; and

(D) develop a work plan and budget.

(3) The student identifies concepts related to geographic diversity. The student is expected to identify significant similarities and differences in the small engine technology industry.

(4) The student describes the historical, current, and future significance of the small engine technology industry. The student is expected to:

(A) define terms associated with the small engine technology industry;

(B) identify the scope and effect of the small engine technology industry on society;

(C) identify significant historical and current developments in the small engine technology industry;

(D) identify potential future scenarios for the small engine technology industry;

(E) identify reasons for world trade and globalization; and

(F) review regulations and major laws to evaluate their impact on the small engine technology industry.

(5) The student demonstrates appropriate personal and communication skills. The student is expected to:

(A) describe and apply ethical and legal responsibilities in the workplace;

(B) demonstrate the uses of proper etiquette and behavior;

(C) identify benefits of personal appearance and health habits;

(D) practice written and oral communication skills and employ effective listening skills; and

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(E) comprehend reading materials common to the transportation industry.

(6) The student uses information technology tools to access, manage, and create information. The student is expected to:

- (A) use personal management software, email applications, and Internet applications;
- (B) use word-processing, database, spreadsheet, and presentation software;
- (C) use collaborative or virtual meeting software;
- (D) explain Geographic Information Systems and Global Positioning Systems applications; and
- (E) use other computer-based equipment in small engine technology.

(7) The student implements strategies to reduce sources of workplace hazards common in industry in order to promote a safe and accident-free working environment. The student is expected to:

- (A) identify, assess, and control hazards to maintain safe working conditions;
- (B) state the role and summarize the benefits of each component in a health, safety, and environmental management system;
- (C) demonstrate emergency procedures to reduce and mitigate workplace accidents;
- (D) perform tool, equipment, facility, and personal protective equipment audits and inspections to maintain compliance with regulations;
- (E) identify rules and laws designed to promote safety and health in the workplace;
- (F) demonstrate knowledge of first aid and cardiopulmonary resuscitation procedures and proper use of safety equipment; and
- (G) determine causes of safety system failures.

(8) The student demonstrates the technical knowledge and skills for small engine technology. The student is expected to:

- (A) identify the use and application of small engines and components;
- (B) identify the basic components of electrical-electronic systems;
- (C) demonstrate knowledge of small engine designs, components, and applications;
- (D) identify and safely use small engine measuring tools;
- (E) safely use tools used in the operation, maintenance, and repair of two- and four-cycle engines;
- (F) discuss the characteristics of two- and four-cycle engines;
- (G) identify the major engine components and their functions;
- (H) read and interpret documents such as engine schematics, charts, and service-repair manuals and bulletins;
- (I) discuss the proper handling and disposal of environmentally hazardous materials used in small engine technology;
- (J) demonstrate knowledge of new and emerging small engine technologies;

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(K) complete repair orders and related paperwork; and

(L) discuss measuring and test equipment.

Advanced Small Engine Technology

(1) The student explores the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify career development and entrepreneurship opportunities in the small engine technology industry, including how to search for and obtain employment, what qualifications are required for varying career fields, and how to advance in a position;

(B) identify careers in the small engine technology industry;

(C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the small engine technology industry;

(D) discuss certification opportunities;

(E) demonstrate skills and knowledge of personal and occupational health and safety in the workplace;

(F) discuss response plans to emergency situations;

(G) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills;

(H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities;

(I) prepare a resumé; and

(J) demonstrate job interview skills.

(2) The student develops an occupational experience program as it relates to the small engine technology industry. The student is expected to:

(A) plan, propose, conduct, and evaluate industry-based occupational experiences; and

(B) use a customized record-keeping system for the individual industry-based occupational experiences.

(3) The student describes the historical, current, and future significance of the small engine technology industry. The student is expected to:

(A) describe how emerging technologies and globalization impacts the small engine technology industry;

(B) compare and contrast issues affecting the small engine technology industry such as employment, safety, and environmental issues; and

(C) describe marketing factors and practices that impact other cultures.

(4) The student analyzes the structure of the small engine technology industry organizations. The student is expected to:

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(A) describe common business management principles;

(B) identify opportunities for leadership development and personal growth;

(C) demonstrate democratic principles in conducting effective meetings;

(D) describe team dynamics;

(E) describe the development of organizational vision, mission, and goals through the strategic planning process;

(F) develop a local program of activities for a career and technical student organization; and

(G) develop a report that summarizes key information about the performance and use of resources within a career and technical student organization.

(5) The student explains the small engine technology industry at local, state, national, and international levels. The student is expected to:

(A) identify reasons for world trade and globalization;

(B) review regulations and major laws to evaluate their impact on the small engine technology industry;

(C) read appropriate written material to stay abreast of current issues impacting the small engine technology industry;

(D) use critical-thinking skills to identify and organize alternatives and evaluate public-policy issues related to the small engine technology industry;

(E) evaluate performance and contract compliance of contractors and service providers;

(F) develop and manage preventative maintenance plans and systems to keep facility, tools, and equipment operating safely and properly;

(G) assess preventive maintenance plans to meet facility, tool, and equipment design and manufacturer requirements;

(H) successfully complete repair orders and paperwork related to the small engine technology industry;

(I) estimate parts and labor costs on repair orders for small engine repair;

(J) read and interpret documents such as small engine schematics, charts, and service-repair manuals and bulletins; and

(K) demonstrate knowledge of new and emerging technologies that may affect the service and repair of small engines.

(6) The student demonstrates appropriate personal and communication skills. The student is expected to:

(A) describe and apply ethical and legal responsibilities for appropriate workplace conduct;

(B) define the uses of proper etiquette and behavior;

(C) identify appropriate personal appearance and health habits;

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(D) practice written and oral communication skills and employ effective listening skills;

(E) comprehend technical reading materials common to the transportation industry;

(F) employ technical writing and preparation skills; and

(G) demonstrate effective speaking skills through prepared and extemporaneous oral presentations.

(7) The student applies appropriate research methods on small engine technology topics. The student is expected to:

(A) define major fields of research and development;

(B) identify and apply scientific methods of research in the small engine technology industry;

(C) use a variety of resources for research and development;

(D) describe the scientific method of research;

(E) evaluate scientific constructs such as conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables; and

(F) apply scientific methods through direct and indirect observation.

(8) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:

(A) develop project proposals;

(B) develop and maintain records appropriate to the small engine technology industry;

(C) collect and organize data in graphs, tables, charts, and plots;

(D) analyze and interpret data from graphs, tables, charts, and plots;

(E) maintain appropriate financial records such as management journals, inventories, income and expense logs, and financial statements and balance sheets;

(F) conduct formative, summative, and financial analyses on project learning objectives and records;

(G) derive engine calculations such as cylinder volume, engine displacement, combustion chamber volume, compressed head gasket volume, piston and deck height, piston dish volume, dome volume, cylinder volume, compression ratio, and horsepower;

(H) derive and measure electrical calculations such as electrical resistance, current, and voltage in engines;

(I) apply Ohm's law and power theory to small engines;

(J) apply electronic theory to generators, electric motors, power supplies, electronic amplifiers, electronic oscillators, and circuits found in engines;

(K) explain Newton's Law as it relates to engines; and

(L) calculate Bernoulli's principle and Venturi effect as it relates to small engines.

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(9) The student uses information technology tools specific to the small engine technology industry to access, manage, integrate, and create information. The student is expected to:

(A) use personal management software such as email applications, Internet applications, word-processing, database, spreadsheet, presentation, collaborative, groupware, and virtual meeting software;

(B) discuss Geographic Information Systems and Global Positioning Systems applications; and

(C) use other computer-based equipment.

(10) The student knows advanced technical knowledge and skills of small engine technology. The student is expected to:

(A) identify the use and application of small engines and components;

(B) identify the components of electrical-electronic systems;

(C) demonstrate knowledge of engine designs, components, and applications;

(D) identify and use engine measuring tools and test equipment;

(E) use tools used in the operation, maintenance, and repair of small engines;

(F) compare and contrast the characteristics of two- and four-cycle engines; and

(G) identify and discuss the functions of the major small engine components.

(11) The student applies advanced technical knowledge and skills in simulated or actual work situations. The student is expected to:

(A) troubleshoot and repair small engines;

(B) perform preventive maintenance on small engines;

(C) assess the proper fuel mixtures and analyze the efficiency of various fuels used in small engines;

(D) distinguish between valve arrangement positions and analyze valve timing with respect to crankshaft rotation;

(E) demonstrate the ability to maintain and service engine systems such as lubrication, belts, cooling, crankcase breathers, filters, starters, ignition, electronics, points, valves, and other systems;

(F) perform routine installations, inspections, adjustments, and maintenance on small engine testing tools and equipment;

(G) demonstrate knowledge of electrical testing tools and equipment commonly used in small engine maintenance;

(H) collect measurements using precision instruments;

(I) evaluate small engine parts for wear tolerances;

(J) explain the relationship between an electric current and magnetic fields using starters, generators, or electromagnets;

(K) analyze the effects of heating and cooling on small engines;

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(L) explain the thermophysical properties of fluid systems commonly used in small engines;

(M) analyze electric circuits and electronic systems in small engines;

(N) define, analyze, and explain the laws of thermodynamics;

(O) evaluate heat energy transfer in small engines;

(P) calculate speed, momentum, acceleration, work, and power in small engines; and

(Q) compare and contrast efficiency of various engine sizes and types.

Transportation Systems Management

(1) The student demonstrates an understanding of the transportation system. The student is expected to:

(A) explain the history and development of the United States transportation systems such as railroads, highways, airports, water systems, and the use of intermodal vans;

(B) examine logistic systems used for the transportation of products and services;

(C) define practices and terms commonly used in international sales contracts as published by the International Chamber of Commerce;

(D) summarize laws and regulations concerning interstate and international trade;

(E) explain the role of homeland security in interstate and international trade;

(F) evaluate risk factors and social and economic trends such as risk mitigation, policy change issues, security issues, and cultural factors;

(G) evaluate documentation and other requirements for interstate and international transportation and logistics;

(H) describe transportation issues such as internal processing, product and supply storage, forecasting, scheduling, cost analysis, documentation confirmation, packing lists, Materials Safety Data Sheets, product seals, packaging types, packaging labels, and routing issues;

(I) identify employer's expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and

(J) demonstrate computer skills related to transportation and materials handling.

(2) The student demonstrates an understanding of Department of Transportation, Environmental Protection Agency, and Occupational Safety and Health Administration hazardous materials regulation knowledge and skills. The student is expected to:

(A) discuss the Department of Transportation, including procedures or policies, material designations, packaging requirements, and operational rules;

(B) explain Department of Transportation, Environmental Protection Agency, and Occupational Safety and Health Administration compliance requirements concerning hazardous materials, hazardous waste operations, medical surveillance, personnel training, adequate ventilation, confined space hazards, and emergency preparedness and response;

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(C) examine personal protective equipment;

(D) compare specifications for accident prevention signs and tags, retention of Department of Transportation markings, and placards and labels for toxic and hazardous materials;

(E) research handling and storage requirements for liquid fuels, liquid petroleum gas, carbon monoxide, and toxic and hazardous substances;

(F) examine emergency action plans, employee training requirements, evacuation procedure requirements, and facility and equipment safety standards;

(G) explain fire prevention, including portable fire extinguishers, fire management systems, employee alarm systems and hazard communication; and

(H) examine fire prevention plans and documentation.

(3) The student demonstrates an understanding of tractor-trailer knowledge and skills. The student is expected to:

(A) read and interpret control systems;

(B) perform vehicle inspections and maintenance such as checking vehicle systems and components, diagnosing potential problems, and developing malfunction reports and maintenance schedules and reports;

(C) perform visual search and inspection of a tractor-trailer;

(D) demonstrate controls of a tractor-trailer such as shifting, backing, docking, coupling and uncoupling, adjusting vehicle speed, and conducting break-down procedures;

(E) explain the management and adjustment of vehicle speed and space relations;

(F) identify potential driving hazards and environmental conditions;

(G) examine emergency maneuvers, procedures, and accident reports; and

(H) discuss appropriate decision-making procedures for planning trips.

(4) The student demonstrates an understanding of forklift knowledge and skills. The student is expected to:

(A) explain Occupational Safety and Health Administration safety standards for forklifts, including equipment operation, battery maintenance, liquid propane tanks, lift truck stability, load weight limits, seat belt requirements, overhead guards, tip over prevention, and ride-out procedures;

(B) perform visual inspection of forklifts and their operating environment;

(C) discuss start-up, shut-down, and proper traveling procedures;

(D) perform maintenance inspections and documentation procedures;

(E) discuss forklift attachments; and

(F) evaluate proper lifting, carrying, load stability, and stacking procedures for loading trailers, boxcars, and containers.

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(5) The student demonstrates an understanding of heavy equipment knowledge and skills. The student is expected to:

(A) explain safety issues pertaining to heavy equipment operation;

(B) discuss principles and maintenance of heavy equipment, including cooling systems, fuel systems, lubrication systems, electrical systems, air systems, power systems, braking systems, pneumatic systems, hydraulic systems, operator ergonomics systems, tires, tracks, and track frames;

(C) examine the operation of heavy equipment such as bull dozers, crawler tractors, backhoes, excavators, track hoes, graders, scrapers, skid steer loaders, mini excavators, dump trucks, trenchers, cranes, hoists, soil compactors, land planes, landscaping equipment, and quarry equipment;

(D) discuss safely transporting heavy equipment; and

(E) discuss equipment theft prevention procedures.

Logistics, Planning, and Management Systems

(1) The student explores the employability characteristics of a successful worker in the modern workplace. The student is expected to:

(A) identify career development and entrepreneurship opportunities in logistics, planning, and management systems, including how to search for and obtain employment, what qualifications are required for varying career fields, and how to advance in a position;

(B) identify careers in logistics, planning, and management;

(C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in logistics, planning, and management;

(D) prepare for certifications required to meet state academic standards and qualify for selected fields of study;

(E) demonstrate knowledge of personal and occupational safety, health, and first-aid policy in the workplace;

(F) develop response plans to emergency situations;

(G) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and

(H) develop personal career goals, objectives, and strategies as part of a plan for future career and educational opportunities.

(2) The student develops an occupational experience program as it relates to logistics, planning, and management systems. The student is expected to:

(A) plan, propose, conduct, and evaluate occupational experiences;

(B) apply proper record-keeping skills as they relate to occupational experiences;

(C) design and use a customized record-keeping system for the individual occupational experiences;

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(D) participate in youth leadership opportunities to create a well-rounded occupational experience; and

(E) develop a work plan and budget.

(3) The student identifies concepts related to cultural diversity. The student is expected to:

(A) identify significant similarities and differences in international cultures;

(B) explain the variety of world markets; and

(C) describe marketing factors and practices that impact other cultures.

(4) The student describes the historical, current, and future significance of the logistics, planning, and management industries. The student is expected to:

(A) define terms associated with the logistics, planning, and management industries;

(B) identify the scope of the logistics, planning, and management industries and their effect on society;

(C) identify significant historical and current logistics, planning, and management industries;

(D) identify potential future scenarios for the logistics, planning, and management industry systems;

(E) describe how emerging technologies and globalization impacts the logistics, planning, and management industries; and

(F) compare and contrast issues affecting the logistics, planning, and management industries such as international trade, employment, safety, and environmental issues.

(5) The student analyzes the structure of logistics, planning, and management organizations. The student is expected to:

(A) describe common business management principles;

(B) identify opportunities for leadership development and personal growth;

(C) demonstrate democratic principles in conducting effective meetings;

(D) describe team dynamics; and

(E) describe the development of organizational vision, mission, and goals through the strategic planning process.

(6) The student explains the logistics, planning, and management industries at local, state, national, and international levels. The student is expected to:

(A) identify reasons for world trade and globalization;

(B) identify the political impact of logistics, planning, and management;

(C) review regulations and major laws to evaluate their impact on the industry;

(D) read appropriate written material to stay abreast of current issues;

(E) collect public opinion and data in order to make informed decisions;

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(F) use critical-thinking skills to identify and organize alternatives and evaluate public policy issues; and

(G) evaluate performance and contract compliance of contractors and service providers.

(7) The student demonstrates appropriate personal and communication skills. The student is expected to:

(A) describe and apply workplace ethical and legal responsibilities;

(B) define the uses of proper etiquette and behavior;

(C) identify appropriate personal appearance and health habits;

(D) practice written and oral communication skills and employ effective listening skills;

(E) comprehend technical reading materials common to the logistics, planning, and management industries;

(F) employ sound writing and preparation skills for prepared and extemporaneous oral presentations as well as presentation of technical information; and

(G) demonstrate speaking skills.

(8) The student applies appropriate research methods for logistics, planning, and management systems topics. The student is expected to:

(A) define major fields of research and development;

(B) demonstrate proficiency in using a variety of resources for both research and development; and

(C) describe the scientific method of research.

(9) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:

(A) discuss project proposals;

(B) develop and maintain records;

(C) collect and organize data in graphs, tables, charts, and plots;

(D) analyze and interpret data from graphs, tables, charts, and plots;

(E) maintain appropriate financial records such as journals, inventories, income and expense logs, and financial statements and balance sheets; and

(F) conduct formative and summative reflective and financial analyses on project learning objectives and records in order to problem-solve for the future.

(10) The student uses information technology tools to access, manage, and create information. The student is expected to:

(A) use personal management software, email applications, and Internet applications;

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(B) use word-processing, database, spreadsheet, and presentation software;

(C) use collaborative or virtual meeting software;

(D) use or explain the benefits of Geographic Information Systems and Global Positioning Systems hardware and applications; and

(E) use computer-based equipment to manage resources.

(11) The student assesses and implements methods to reduce sources of workplace hazards common in the industry in order to promote a safe and accident-free working environment. The student is expected to:

(A) identify, assess, and control hazards to maintain safe and healthful working conditions;

(B) state the role and summarize the benefits of each component in a health, safety, and environmental management system;

(C) demonstrate emergency procedures to reduce and mitigate workplace accidents;

(D) perform tool, equipment, facility, and personal protective equipment audits and inspections;

(E) identify rules and laws designed to promote safety and health in the workplace; and

(F) demonstrate knowledge of first aid and cardiopulmonary resuscitation procedures and proper use of safety equipment.

(12) The student examines the planning, preparation, processing, handling, and storing of goods and materials in warehouses and distribution centers. The student is expected to:

(A) determine risks or damage from normal rigors such as compression, shock, drop, moisture, corrosion, vibration, temperature, and motion during transportation and handling;

(B) discuss the transporting and handling of hazardous materials;

(C) explain size, weight, and shape requirements for packaging;

(D) discuss handling, storage, and shipping methods for various types of packaging and warehouse and shipping providers;

(E) assess requirements for various packaging types;

(F) analyze visual design and appearance requirements, including handling information, warnings, display requirements, and required documentation;

(G) create layout plans for processing incoming and outgoing, cross-docking, and storage of products;

(H) evaluate material handling and storage equipment;

(I) assess the processing of incoming goods and materials using standardized industry protocols and procedures; and

(J) examine equipment and staffing requirements and develop traffic management plans and work schedules.

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(13) The student reviews issues related to interstate and international trade. The student is expected to:

(A) define terms commonly used in sales contracts as published by the International Chamber of Commerce;

(B) summarize laws and regulations concerning interstate and international trade;

(C) explain the role of homeland security in interstate and international trade;

(D) evaluate risk factors and social and economic trends such as risk mitigation, policy change issues, security issues, and cultural changes;

(E) evaluate documentation and other requirements for interstate and international transportation and logistics; and

(F) describe transportation issues such as internal processing, product and supply storage, forecasting, scheduling, cost analysis, documentation confirmation, packing lists, Material Safety Data Sheets, product seals, packaging types, packaging labels, and routing issues.

Practicum in Transportation, Distribution, and Logistics

(1) The student demonstrates professional standards as required by business and industry. The student is expected to:

(A) adhere to policies and procedures;

(B) demonstrate positive work behaviors and attitudes, including punctuality, time management, initiative, and cooperation;

(C) accept constructive criticism;

(D) apply ethical reasoning to a variety of situations in order to make ethical decisions;

(E) complete tasks with the highest standards to ensure quality products and services;

(F) model professional appearance, including dress, grooming, and personal protective equipment as appropriate; and

(G) comply with practicum setting safety rules and regulations to maintain safe and healthful working conditions and environments.

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

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

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

(C) compare and contrast alternatives using a variety of problem-solving and critical-thinking skills; and

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

(3) The student demonstrates leadership and teamwork skills in collaborating with others to accomplish goals and objectives. The student is expected to:

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(A) analyze leadership in relation to trust, positive attitude, integrity, and willingness to accept key responsibilities in a work situation;

(B) demonstrate teamwork skills through working cooperatively with others to achieve tasks;

(C) demonstrate teamwork processes that promote team building, consensus, continuous improvement, respect for the opinions of others, cooperation, adaptability, and conflict resolution;

(D) demonstrate responsibility for shared group and individual work tasks;

(E) establish and maintain effective working relationships in order to accomplish objectives and tasks;

(F) demonstrate effective working relationships using interpersonal skills;

(G) use positive interpersonal skills to work cooperatively with others;

(H) negotiate effectively to arrive at decisions;

(I) demonstrate respect for individuals, including those from different cultures, genders, and backgrounds; and

(J) demonstrate sensitivity to and value for diversity.

(4) The student demonstrates oral and written communication skills in creating, expressing, and interpreting information and ideas, including technical terminology and information. The student is expected to:

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

(B) employ verbal skills when obtaining and conveying information;

(C) use informational texts, Internet websites, and technical materials to review and apply information sources for occupational tasks;

(D) evaluate the reliability of information from informational texts, Internet websites, and technical materials and resources;

(E) interpret verbal and nonverbal cues or behaviors to enhance communication;

(F) apply active listening skills to obtain and clarify information; and

(G) use academic skills to facilitate effective written and oral communication.

(5) The student demonstrates technical knowledge and skills required to pursue a career in the Transportation, Distribution, and Logistics cluster. The student is expected to:

(A) develop advanced technical knowledge and skills related to the student's personal career goals;

(B) evaluate technical skill proficiencies; and

(C) accept critical feedback provided by the supervisor.

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The student documents technical knowledge and skills. The student is expected to:

(A) update a professional portfolio to include:<ol type="i">
attainment of technical skill competencies, licensures or certifications, recognitions, awards, and scholarships;
extended learning experiences such as community service and active participation in career and technical student organizations and professional organizations;
abstract of technical competencies mastered during the practicum;
resumé;
samples of work; and
evaluation from the practicum supervisor; and

(B) present the portfolio to all interested stakeholders such as in a poster presentation.