Intro to Vehicle Systems & Maintenance

Career Cluster	Transportation, Distribution & Logistics
Course Code	20106
Prerequisite(s)	None
Credit	.5 or 1
Program of Study and Sequence	Any Foundation course – **Intro to Vehicle Systems & Maintenance** – pathway course in the automotive technology; automotive body, collision & refinishing; or diesel pathway
Student Organization	SKillsUSA
Coordinating Work-Based Learning	NA
Industry Certifications	NA
Dual Credit or Dual Enrollment	NA
Teacher Certification	Transportation, Distribution & Logistics Cluster Endorsement; Automotive Technology Pathway Endorsement; *Automotive Technology *7-12 Technology Education
Resources	

Course Description:

Intro to Vehicle Systems & Maintenance is an introductory automobile course. Students will study the basic principles of electrical and mechanical systems used in motor vehicle technology while developing core hand skills. This course is designed to give learners an insight into careers in the automotive service and repair industry and encourages learners to undertake many maintenance and repair tasks.

Program of Study Application

Intro to Vehicle Systems and Maintenance is a cluster course in the transportation, distribution and logistics cluster. Intro to Vehicle Systems and Maintenance will prepare a student to enter any of the pathways in the cluster.

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Course Standards

IVSM 1 Students will demonstrate automotive technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements, for an automotive repair facility.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 1.1 Demonstrate automotive technician safety practices Examples: • Use protective clothing and safety equipment according to OSHA and EPA requirements. • Summarize the proper use of safety data sheet (SDS) • Demonstrate the proper use of hand and power tools • Examine basic shop safety using OSHA standards • Maintain a portfolio of successfully completed safety and equipment exams	• OSHA 10
Level 2 Skill/Concept	IVSM 1.2 Understand the way in which waste gasses, emissions, and other environmentally destructive substances are generated and their effects on the environment Examples: • Understand the formation of carbon monoxide in internal combustion engines and the effects on the environment • Study the effects of vehicle emissions on the eco-system • Compare the emissions of hydro-fuel cell, electric, and gasoline powered vehicles	

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IVSM2 Students explore career opportunities in the transportation, distribution and logistics career cluster and develop leadership skills.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 2.1 Demonstrate independent and teamwork skills Examples: • Participate in Career and Technical Student Organizations (CTSO's) • Develop a teamwork project (change oil, tire rotation)	• SKillsUSA
Level 2 Skill/Concept	IVSM 2.2 Explore career opportunities within the industry Examples: • Utilize guidance software to research and report on career opportunities • Update student portfolios and personal learning plans	• SDMyLife • Classroom speakers

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IVSM3 Students will demonstrate an understanding of the safe and appropriate use of tools, equipment and work processes.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	ITVSM 3.1. Understand and use the appropriate tools and equipment Examples: • Demonstrate proper usage of tools and equipment • Inspect and perform preventative and required maintenance of tools and equipment	
Level 2 Skill/Concept	IVSM 3.2. Diagnose and analyze components and systems Examples: • Use DMM (digital multi-meter) to measure electrical voltage, amps and resistance • Demonstrate use of a load tester on a battery, charging, and starting systems	
Level 2 Skill/Concept	IVSM 3.3. Select and demonstrate proper use of measuring devices and mathematical formulas Examples: • Identify the measuring instruments needed to assure proper tolerance ranges can be achieved (micrometer, caliper) • Identify, apply, and calculate mathematical formulas that apply to the automotive industry (Ohm's Law, cubic displacement, horse power)	
Level 2 Skill/Concept	IVSM 3.4. Use and understand standard and metric units of measurements Examples: • Measure brake rotor with caliper and compare to specifications • Measure tread width and mathematically calculate the sidewall height of the tire using the aspect ratio of the tire • Convert standard units and metric units	
Level 2 Skill/Concept	IVSM 3.5. Use measurement devices to diagnose and repair vehicles and components following industry standards Examples: • Identify tools and equipment used to measure caster, camber and toe • Measure resistance in spark plug high-tension leads to assure proper operation of ignition system	

Level 2 Skill/Concept	IVSM 3.6. Demonstrate access and proper usage of Technical Service Bulletins (TSB) and service manuals Examples: • Utilize service information to find vehicle specifications • Use vehicle owner's manual to find proper quantity and quality of oil to use to perform an engine oil and filter change • Use scan tool to pull trouble codes from vehicle's computer diagnostic system	
Level 3 Strategic Thinking	IVSM. 3.7. Comprehend the importance of calibration processes, systems, techniques using various measuring and testing devices Examples: • Calibrate of a dial indicator • Check the accuracy of an outside/inside micrometer • Calibrate an Ohm meter	

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IVSM 4 Students understand scientific principles in relation to chemical, mechanical, and physical functions of various power plants and vehicle systems.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 4.1. Demonstrate knowledge of the operation of the internal combustion engine Examples: • Identify different types of gasoline and diesel engines and 2 & 4 stroke engines • Compare the similarities and differences in a 2 and 4 stroke cycle	Briggs and Stratton
Level 2 Skill/Concept	IVSM 4.2. Demonstrate a basic understanding of the operating principles of heating and air conditioning systems Examples: • Identify the components of heating and air conditioning systems • Describe the air flow and refrigerant flow in heating and air conditioning systems	
Level 2 Skill/Concept	IVSM 4.3. Compare alternate fuel and power sources Examples: • Identify and research hybrid, fuel cell, and electric vehicles for a written report or presentation	

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IVSM 5 Students perform and document maintenance procedures according to manufacturers' specifications.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 3 Strategic Thinking	IVSM 5.1. Demonstrate the procedures and practices for manufacturer's repair and maintenance schedules Examples: • Change oil and filter according to manufacturer's specs • Check proper inflation and condition of vehicle tires • Check and refill critical fluids • Inspect belts and hoses	Briggs and Stratton
Level 3 Strategic Thinking	IVSM 5.2. Demonstrate the use of service information to repair a vehicle Examples: • Utilize service information to find vehicle specifications • Use vehicle owner manual to find proper quantity and quality of oil to use to perform an engine oil and filter change	
Level 3 Strategic Thinking	IVSM 5.3. Demonstrate proper procedures for work order, customer information, and billing information completion Examples: • Demonstrate the proper use of a repair order that contains critical information • Complete work orders with customer, labor, and parts information	

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IVSM 6 Students will understand and apply appropriate business practices.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 3 Strategic Thinking	IVSM 6.1 Demonstrate the importance of, and the procedures for, maintaining accurate records Examples: • Recording the mileage of a vehicle on the work order for warranty purposes • Billing of customers and collection of funds • Taxes and required taxable income	
Level 3 Strategic Thinking	IVSM 6.2 Understand the concept and application of ethical business practices Examples: • Marking up parts for profit • Installation of quality new and/or used parts • Making only necessary repairs	
Level 3 Strategic Thinking	IVSM 6.3 Understand the concept and application of acceptable customer relations practices Examples: • Return all settings of radio, seat and steering wheel positions to customer's settings • Respect customer's opinions of the vehicle's problems	

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IVSM7 Students will understand and apply appropriate vehicle service and repairs.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 7.1 Perform general engine diagnosis and repair in professional manner within National Automotive Technicians Education Foundation (NATEF) standards Examples: • Perform engine compression test (dry/wet) • Set gap, and replace spark plugs and wires as needed	
Level 2 Skill/Concept	IVSM 7.2 Demonstrate ability to maintain and service lubrication and cooling systems Examples: • Analyze engine oil pressure • Remove and install an oil pressure sending unit • Inspect and test cooling system and pressure cap	
Level 2 Skill/Concept	IVSM 7.3 Understand the basic operation of computer controlled systems, and location and identification of related parts Examples: • Use a code reader and or scanner to diagnose computer system failure • Locate and test computer components • Clear trouble codes from computer with scanner	

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IVSM8 Students understand the function, principles and operation of electrical systems using manufacturers' and industry standards.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 8.1 Demonstrate an understanding of how to diagnose and repair electrical systems Examples: • Clean battery terminals and electrical connections • Use DVOM (digital volt ohm meter) to check voltage drop at connections • Use DVOM to check resistance in electrical circuits	
Level 2 Skill/Concept	IVSM8.2 Diagnose and service batteries Examples: • Check battery state-of-charge with hydrometer or DVOM • Check battery load capacity with load tester • Remove and replace battery	
Level 2 Skill/Concept	IVSM 8.3 Demonstrate knowledge needed to diagnose and repair starting and charging systems Examples: • Check starting system draw with starting system tester • Check charging system output with charging system tester	
Level 2 Skill/Concept	IVSM 8.4 Demonstrate ability to properly diagnose and repair lighting systems Examples: • Adjust headlights • Replace bulbs • Test electrical system circuits and components	
Level 2 Skill/Concept	IVSM 8.5 Demonstrate ability to properly diagnose and repair heating and air conditioning systems Examples: • Test strength and condition of coolant • Remove and replace coolant and flush if needed • Test output temperature of A/C system	

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IVSM9 Students understand the function and principles of automotive brake, steering and suspension, automatic and manual transmission systems.

Webb Level	*Sub-indicator*	*Integrated Content*
Level 2 Skill/Concept	IVSM 9.1 Demonstrate how to diagnose and service hydraulic and friction systems Examples: • Check brake pad dimensions and conditions • Check condition of rotor and/or drum • Check for leaks, cracks or bulges in brake lines • Check emergency brake cable operation	
Level 2 Skill/Concept	IVSM 9.2 Demonstrate how to diagnose and service steering and suspension systems Examples: • Check for proper power steering fluid condition and level • Check condition of front and rear struts and/or shocks	
Level 2 Skill/Concept	IVSM 9.3 Demonstrate how to diagnose and service automatic and manual transmissions Examples: • Check automatic and manual transmission fluid levels • Replace automatic transmission fluid and filter	

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