WHITEWATER CAREER CENTER
CULINARY ARTS

Scope and Sequence
Curriculum Outline

Career Program: Automotive Technology I
DOE Code: 5510
Career Cluster: Transportation
Recommended Grade Levels: 11, 12
Prerequisites: None
High School Credits: 3 per semester (6 total per school year)
Additional Information: Counts as a Directed Elective or Elective for the General, Core 40, Academic Honors and Technical Honors diplomas

Program Description: Students in Automotive Technology I learn to maintain and repair all types of vehicles. Students learn about steering and suspension, braking systems, manual transmissions and differentials, automatic transmissions, air conditioning, and engine repair. Mathematical skills will be reinforced through precision measuring activities and cost estimation/ calculation activities. Scientific principles taught and reinforced in this program include the study of viscosity, friction, thermal expansion, and compound solutions. Written and oral skills will also be emphasized to help students communicate with customers, other students, and instructors. This program is NATEF (National Automotive Technicians Education Foundation) certified.

Alignment: Indiana Department of Education Academic Standards Course Framework; ASE (National Institute for Automotive Service Excellence) student certification; NATEF (National Automotive Technicians Education Foundation) program accreditation standards; Ivy Tech Community College (dual credit agreement); and *Light Vehicle Online* text and student workbook (CDX), *PAC Fundamentals of Automotive Technology* (CDX), and *S/P2 Safety Training* (S/P2) curriculum materials

Companion Documents: WCC Automotive Technology I Program Syllabus; WCC High School Pathway Plan; WCC Program Description Guide

Curriculum Content Summary:

- Employability
- Knowledge/Understanding
- Diagnosis
- Repair

Content	Indiana DOE Standards	Knowledge & Skills *(based on ASE/NATEF)*	Example Activities	Time Frame*	Evaluation / Certification
DOMAIN Employability **Core Standard I** Students apply and adapt appropriate workplace behaviors and characteristics to prepare for automotive careers	**ASTI-1.1** Demonstrate effective interpersonal skills **ASTI-1.2** Develop leadership skills **ASTI-1.3** Research, analyze, and use data for work assignments **ASTI-1.4** Apply written communication skills **ASTI-1.5** Demonstrate effective listening and speaking skills **ASTI-1.6** Perform appropriate mathematical calculations correctly **ASTI-1.7** Exhibit a responsible work ethic **ASTI-1.8** Demonstrate accepted standards for ethical behavior **ASTI-1.9** Establish a personal career goal and develop objectives for achieving the goal **ASTI-1.10** Create a continuing education plan that identifies further education and training options **ASTI-1.11** Prepare for exams leading to certifications recognized by business and industry **ASTI-1.12** Develop skills needed to enter the workforce **ASTI-1.13** Evaluate resources that keep workers current in the career field **ASTI-1.14** Apply effective money management strategies **ASTI-1.15** Use and identify tools and equipment used to repair brake systems	• Reports to work daily on time • Able to take directions and is motivated to accomplish the task at hand • Dresses appropriately and uses language and manners suitable for the workplace • Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. • Demonstrates honesty, integrity, and reliability • Works well with all customers and coworkers • Negotiates solutions to interpersonal and workplace conflicts • Follows directions • Communicates effectively with customers and coworkers • Reads and interprets workplace documents • Analyzes and resolves problems that arise in completing assigned tasks • Organizes and implements a productive plan of work • Uses scientific, technical, engineering, and mathematics principles and reasoning to accomplish assigned tasks • Identifies and addresses the needs of all customers, providing helpful, courteous, and knowledgeable service and advice as needed	• Classroom activities • Training videos • Written assignments • Industry speakers • Postsecondary speakers • SkillsUSA membership • Skills competitions • Student ambassadors • NTHS • Field trips	9 weeks Reinforced throughout the year	• Chapters 5 & 7 exams • Participation/lab work • Essential Skills Evaluation • Technical Skills Evaluation • Work Ethic Certification

Content	Indiana DOE Standards	Knowledge & Skills *(based on ASE/NATEF)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Knowledge/Understanding **Core Standard 2** Students analyze vehicle components and system operations to establish accurate diagnosis and repair procedures	**ASTI-2.1** Allocate the appropriate resources for task completion **ASTI-2.2** Read and interpret written materials **ASTI-2.3** Demonstrate knowledge of vehicle system **ASTI-2.4** Explain safety procedures **ASTI-2.5** Disable supplemental restraint systems in accordance with manufactures' procedures **ASTI-2.6** Describe steering and alignment geometry **ASTI-2.7** Score satisfactory grade on tests, quizzes, and lab assignments **ASTI-2.8** Demonstrate proper shop safety practices while using brake tools and equipment **ASTI-2.9** Use and identify tools and equipment used to repair brake systems **ASTI-2.10** Identify and explore operation, construction, and nomenclature of braking system components including hydraulic control devices **ASTI-2.11** Identify and explore operation and repair on and ABS and traction control systems	• Identify general shop safety rules and procedures • Utilize safe procedures for handling tools and equipment • Identify and use proper placement of floor jacks, jack stands, and lifts • Utilize proper ventilation procedures in the shop • Identify the location and proper use of fire extinguishers and eye wash stations • Identify the location of the evacuation routes • Comply with the use the PPE • Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits • Demonstrate awareness of the safety aspects of high voltage circuits • Locate and demonstrate knowledge of MSDS • Identify tools and their usage in automotive applications • Identify standard and metric designation • Demonstrate safe handling and use of appropriate tools • Demonstrate proper cleaning, storage, and maintenance of tools and equipment • Demonstrate proper use of precision measuring tools • Identify information needed and the service requested on a repair order • Identify purpose and demonstrate proper use of fender covers and mats • Review vehicle service history • Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction • Ensure vehicle is prepared to return to customer per company policy	• Classroom activities • Written assignments • Lab/shop demonstrations • Lab/shop work • Customer diagnosis and repair work	9 weeks Reinforced throughout the year	• Maintenance & Light Repair (MLR) task sheets • Chapters 3-7, 36-40, 42, 43, & 46 exams • Practical evaluation of a solder repair • ASE certifications • SP2 certifications • Participation/lab work • Dual credit

Content	Indiana DOE Standards	Knowledge & Skills *(based on ASE/NATEF)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Diagnosis **Core Standard 3** Students analyze vehicle system defects to determine necessary service	**ASTI-3.1** Apply effective critical thinking, decision making, and problem-solving techniques **ASTI-3.2** Evaluate resources that keep workers current in the career field **ASTI-3.3** Conduct other related engine service activities **ASTI-3.4** Examine brake systems **ASTI-3.5** Analyze suspension and steering systems performance and determine repairs **ASTI-3.6** Diagnose power steering systems and determine need for replacement **ASTI-3.7** Diagnose steering and suspension components to determine need for replacement **ASTI-3.8** Analyze suspension and steering systems performance and determine repair **ASTI-3.9** Remove and replace steering and suspension components **ASTI-3.10** Diagnose McPherson strut assembly according to industry standards **ASTI-3.11** Diagnose rear suspension system and determine needed service or repair **ASTI-3.12** Remove, inspect and service or replace front or rear wheel bearings **ASTI-3.13** Check and adjust all 4-wheel alignment angles and measurements **ASTI-3.14** Inspect, rotate, mount, and balance tires **ASTI-3.15** Perform pre-alignment checks according to industry standards **ASTI-3.16** Use and identify tolls and equipment used to repair brake systems **ASTI-3.17** Diagnose and repair ABS and traction control systems **ASTI-3.18** Troubleshoot, clean, and replace components of transmission system.	• Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins • Disable and enable supplemental restraint system (SRS); verify indicator lamp operation • Identify suspension and steering system components and configurations • Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots • Inspect power steering fluid level and condition • Inspect for power steering fluid leakage • Inspect pitman arm, relay (centerlink/ intermediate) rod, idler arm, mountings, and steering linkage damper • Inspect tie rod ends, tie rod sleeves, and clamps • Inspect upper and lower control arms, bushings, and shafts • Inspect track bar, strut rods/radius arms, and related mounts and bushings • Inspect upper and lower ball joints (with or without wear indicators) • Inspect suspension system coil springs and spring insulators (silencers) • Inspect suspension system torsion bars and mounts • Inspect and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links • Inspect front strut bearing and mount • Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms • Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts • Perform prealignment inspection; measure vehicle ride height • Describe alignment angles (camber, caster and toe) • Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure • Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly • Dismount, inspect, and remount tire on wheel equipped with TPMS sensor • Inspect tire and wheel assembly for air loss; determine necessary action	• Classroom activities • Written assignments • Lab/shop demonstrations • Lab/shop work • Student test drives • Customer diagnosis work	9 weeks Reinforced throughout the year	• Maintenance & Light Repair (MLR) task sheets • Chapters 44 & 46-51 exams • ASE certifications • SP2 certifications • Participation/lab work • Dual credit

		• Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps • Demonstrate knowledge of steps required to remove and replace sensors in a TPMS, including relearn procedure • Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS) • Identify brake system components and configuration • Describe proper brake pedal height, travel, and feel • Check master cylinder for external leaks and proper operation • Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings/supports • Select, handle, store, and fill brake fluids to proper level; use proper fluid type per manufacturer specification • Test brake fluid for contamination • Remove, clean, and inspect brake drum; measure brake drum diameter; determine serviceability • Remove and clean caliper assembly; inspect for leaks and damage/wear; determine necessary action • Inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action • Remove, inspect, and/or replace brake pads and retaining hardware; determine necessary action • Clean and inspect rotor and mounting surface, measure rotor thickness, thickness variation, and lateral runout; determine necessary action • Check brake pad wear indicator; determine necessary action • Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendation • Identify components of the brake power assist system (vacuum and hydraulic); check vacuum supply (manifold or auxiliary pump) to vacuum type power booster • Check parking brake operation and parking brake indicator light system operation; determine necessary action • Check operation of brake stop light system			

Content	Indiana DOE Standards	Knowledge & Skills *(based on ASE/NATEF)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Repair **Core Standard 4** Students select appropriate industry tools and procedures to perform service and repairs on various vehicle components and systems	**ASTI-4.1** Select and use appropriate tools and technology **ASTI-4.2** Implement quality assurance measures and safeguards **ASTI-4.3** Develop skills needed to enter the workforce **ASTI-4.4** Evaluate resources that keep workers current in the career field **ASTI-4.5** Conduct other related engine service activities **ASTI-4.6** Service brake systems **ASTI-4.7** Disable supplemental restraint systems in accordance with manufactures' procedures **ASTI-4.8** Diagnose steering and suspension components to determine need for replacement **ASTI-4.9** Remove and replace steering and suspension components **ASTI-4.10** Remove and replace McPherson struts according to industry standards **ASTI-4.11** Remove, inspect and service or replace front or rear wheel bearings **ASTI-4.12** Demonstrate proper shop safety practices while using brake tools and equipment **ASTI-4.13** Use and identify tools and equipment used to repair brake systems **ASTI-4.14** Identify and explore operation and repair on and ABS and traction control systems	• Remove, inspect, replace, and/or adjust power steering pump drive belt • Inspect and replace rebound bumpers • Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings • Rotate tires according to manufacturer's recommendations including vehicles equipped with tire pressure monitoring systems (TPMS) • Repair tire following vehicle manufacturer approved procedure • Install wheel and torque lug nuts • Bleed and/or flush brake system • Refinish brake drum and measure final drum diameter; compare with specification • Remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble • Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments • Lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads and inspect for leaks • Remove and reinstall/replace rotor • Refinish rotor on vehicle; measure final rotor thickness and compare with specification • Refinish rotor off vehicle; measure final rotor thickness and compare with specification • Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings • Inspect and replace wheel studs	• Classroom activities • Written assignments • Lab/shop demonstrations • Lab/shop work • Customer repair work	9 weeks Reinforced throughout the year	• Maintenance & Light Repair (MLR) task sheets • Chapters 8, 10, 15, 45, & 46 exams • ASE certifications • SP2 certifications • Participation/lab work • Dual credit

*"The ASE/NATEF Maintenance and Light Repair curriculum requires 540 hours of training plus more than 400 hours of classroom and lab time for review, employability competency training, and inclusion of other tasks reviewed, approved, and/or added by the Advisory Committee." (ASE/NATEF Training Plan, 2017)