

Automotive Mechanics Technology (AMT)

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AMT 16 : Car Care

Credits: 1

2 lecture/lab

Description: This course offers technical information on the history and development of automobiles; the function of the lubricating, cooling, fuel, and electrical systems; the major automobile components; minor trouble-shooting; tire changing; and car maintenance.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
2. Identify systems and components of an automobile.
3. Demonstrate the use of reference training materials, use appropriate tools and equipment to perform basic car maintenance and repair.

AMT 18 : Minor Tune-up and Repair

Credits: 2

Class Hours: 4 lecture/lab

Description: This course is designed to help students acquire an understanding of some of the elementary principles involved in the operation and maintenance of the various units of an automobile. Emphasis is upon developing the student's interest in minor automotive repair in a safe and efficient manner.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable principles involved in the operation and maintenance of automotive systems.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate the use of reference training materials, use appropriate tools and equipment to perform minor tune-up repair/service on automotive systems and components.

AMT 80 : Introduction to Small Engines Repair

Credits: 2

Class Hours: 4 lecture/lab

Description: This class introduces students to the field of small gasoline engine repair. An overview of job opportunities and skills required is included. The course emphasizes shop safety, tool use and identification, and the general construction and repair of small gasoline engines.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of small engine systems.
2. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect and perform needed repair/service on small engine systems and components.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 100 : Introduction to Automotive Technology

Credits: 2

Class Hours: 4 lecture/lab

Description: This course will cover policies and procedures of the Automotive Technology (AMT) program, various career opportunities in the automotive field, shop safety, proper use of technical reference manuals and identifying and proper use of basic hand tools and precision measuring tools.

Semester Offered: Fall, Spring, Summer

Course Student Learning Outcomes (CSLOs):

1. Identify systems and components of an automobile and properly use hand tools, measuring tools, and perform scheduled maintenance and repairs.
2. Identify various career opportunities in the automotive field.
3. Demonstrate the proper use and understanding of technical service resources.
4. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards for safety.

AMT 120B : Auto Metal Work and Welding

Credits: 4

Class Hours: 8 lecture/lab

Description: This course is designed to acquaint the student with the basic skills used in auto body welding. Emphasis will be placed on safety; protective clothing; tools and equipment procedures; and techniques of gas metal arc welding (GMAW), oxyacetylene gas welding, and plasma arc cutting.

Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate methods and techniques using the appropriate tools and equipment to perform Oxy/Acetylene, MIG, and Squeeze Type Resistance welds.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate an understanding of proper set up and use of welding and cutting equipment for specific applications.
4. Demonstrate methods and techniques using the appropriate tools and equipment to perform Oxy/Acetylene and Plasma cutting.

AMT 126B : Non-Structural Analysis and Repair I

Credits: 4

Class Hours: 8 lecture/lab

Description: This course is designed to teach the student conventional and unitized body construction. Emphasis will be placed on what can be repaired and what must be replaced. Students will learn to lay out and fabricate repair panels from gauge sheet metal and repair rust damage.

Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable Non-Structural damage repair procedures.
2. Demonstrate methods and techniques using the appropriate tools and equipment to perform Non-Structural damage repairs to a vehicle.
3. Demonstrate methods and techniques using the appropriate tools and equipment to perform plastic material repairs to a vehicle.
4. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 129 : Engine Repair

Credits: 7

Class Hours: 14 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course will cover shop safety, tools and all components found in the modern internal combustion engine. The course is designed to provide students with an understanding of the fundamental operation and

construction of internal combustion engines. Instruction will include theory and laboratory (shop) activities in which students will learn how to inspect, service, maintain, diagnose, and repair automobile engine malfunctions. This course includes live work.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and fundamental principles of engine systems.
2. Demonstrate the use reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on engine systems and components.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 134B : Paint Prep and Refinishing I

Credits: 4

Class Hours: 8 lecture/lab

Description: This course is designed to teach students the techniques and methods of automobile surface painting preparation and introductory painting procedures. The course incorporates an emphasis on proper safety procedures and practises for automotive refinishing, which includes OSHA guidelines, Right-to-Know Act, and EPA laws.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate methods and techniques using the appropriate tools and equipment in preparing the surface of an automobile to be painted.
2. Perform paint mixing at recommended ratios and demonstrate paint equipment usage, maintenance, and cleaning.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 136B : Non-Structural Analysis and Repair II

Credits: 6

Class Hours: 12 lecture/lab

Prerequisites: "C" or higher in AMT 126B.

Description: This course is designed to teach the student conventional and unitized body repair. Emphasis will be placed on outer body panel repairs, replacements and adjustments to manufacturer's specifications.

Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of Non-Structural damage repair estimating and repair procedures.
2. Demonstrate methods and techniques using the appropriate tools and equipment to perform panel replacement, metal finishing, and plastic material repair to Non-Structural damaged areas of a vehicle.
3. Demonstrate methods and techniques using the appropriate tools and equipment to perform stationary and moveable glass repairs to a vehicle.
4. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 141 : Electrical/Electronic Systems I

Credits: 5

Class Hours: 10 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course will provide students with fundamental principles of automotive electricity and electronics. Practical skills to diagnose, test, and service battery, starting, charging and lighting systems are covered. Testing and repair of electrical safety devices, wiring, connectors, and relays are also covered.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on electrical systems and components.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate an understanding of applicable theories of operation and fundamental principles of electrical systems.

AMT 144 : Heating and Air Conditioning

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course provides an understanding of the theory, diagnosis, service, safety handling of refrigerant and repair of automotive heating, ventilation, and air conditioning (HVAC) systems. The course presents the operation and function of vacuum, electrical, refrigeration circuits, and computer controls. Training is provided on the use of tools and equipment while performing diagnostics, repairs, and service on HVAC systems.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of heating, ventilation and air conditioning (HVAC) systems.
2. Demonstrate the use of reference training materials, use of appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on heating, ventilation and air conditioning (HVAC) systems and components.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 144B : Paint Prep and Refinish II

Credits: 6

Class Hours: 12 lecture/lab

Prerequisites: "C" or higher in AMT 134B.

Description: This course is designed to teach the student techniques and methods of painting the auto body. Emphasis will be placed on paint mixing, matching of colors and different types of paint, and proper paint application.

Semester Offered: Fall, Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable procedures to prepare the surface area and techniques used for proper paint application.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate preparation procedures on surface area to be painted.
4. Perform paint mixing and matching at recommended ratios and demonstrate proper paint application procedures.

AMT 145 : Manual Drive Trains and Axles

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course covers the theory and fundamental operating principles of the modern automotive drive trains and axles. Students learn maintenance and repair of C-V shafts, propeller shafts, clutch systems, standard transmissions, standard transaxles, all-wheel drive, four-wheel drive and final drive systems.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of manual drive train and axle systems.

2. Demonstrate an understanding and comply with personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate the use of reference training materials, use of appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on manual drive train and axles systems and components.

AMT 149 : Automatic Transmission and Transaxle

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course covers the fundamental principles of automatic transmission design and operation found on Front Wheel Drive (FWD) and Rear Wheel Drive (RWD) automobiles. Service, repair, and overhaul procedures are included for a variety of import and domestic automatic transmissions.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials, use of appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on automatic transmission and transaxle systems and components.
2. Demonstrate an understanding of applicable theories of operation and principles of automatic transmission and transaxle systems.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 152 : Brake Systems

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course covers the principles in the operation of the modern automotive brake system. Further development in new technology such as computerized ABS (Anti-skid Brake Systems), electronic power brakes, and four-wheel disc brakes will be covered. Repair and service techniques of the complete brake system will be demonstrated.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on brake systems and components.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate an understanding of applicable theories of operation and principles of brake systems.

AMT 154 : Suspension and Steering Systems

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 100.

Description: This course presents the theory and practical application of the operation, problem diagnosis, maintenance and repair of the modern suspension and steering systems to include: front wheel drive steering and suspension systems; rear wheel drive steering and suspension systems; four wheel drive steering and suspension systems; and all-wheel drive steering and suspension systems. Wheel alignment and tire servicing are also covered.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of suspension and steering systems.

2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on suspension and steering systems and components.

AMT 171 : HEV I - Introduction to Hybrid and Electric Vehicle Technology

Credits: 3

Class Hours: 1 lecture and 6 lab

Prerequisites: "C" or higher in AMT 141 or automotive industry work experience with instructor's approval.

Recommended: Basic electrical knowledge of Ohm's Law and proper use of a DMM to determine voltage drop, shorts, opens, and resistance problems. Knowledge on basic theory of operation on automotive electrical and mechanical subsystems.

Description: This course is designed to familiarize the student with the safety, electrical and electronic theories related to hybrid and electric vehicles, high voltage analysis tools used in hybrid and electric vehicles, high voltage safety systems, AC induction electric machines, and permanent magnet electric motors theory and construction. Hands-on application to safety disconnect and use of high voltage analysis tools to perform basic checks.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of basic principles of theory and operation on Hybrid and Electric Vehicles.
2. Identify high voltage circuits and systems on Hybrid and Electric Vehicles.
3. Demonstrate proper procedures to safely disable vehicle high voltage circuit systems.
4. Locate and use reference training materials and use appropriate tools, testing and measuring equipment to perform basic system checks and needed repair/service on Hybrid and Electric Vehicle systems.
5. Perform all tasks while observing all industry-standard personal and environmental safety practices.

AMT 172 : HEV II - Preventive Maintenance and Repair

Credits: 3

Class Hours: 1 lecture and 6 lab

Prerequisites: "C" or higher in AMT 171 or automotive industry work experience with instructor's approval.

Recommended: Basic electrical knowledge of Ohm's Law and proper use of a DMM to determine voltage drop, shorts, opens, and resistance problems. Knowledge on basic theory of operation on automotive electrical and mechanical subsystems.

Description: This course is designed to familiarize the student with hybrid and electric vehicle safety, hybrid internal combustion engines (ICE), regenerative braking systems, high voltage climate control system, power inverter and battery pack cooling systems, high voltage analysis tools used, high voltage safety systems, and 12 volt systems used in hybrid and electric vehicles. Hands-on application to safety disconnect, use of high voltage analysis tools to perform basic checks, and perform service and preventive maintenance on hybrid and electric vehicles.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Identify high voltage circuits and systems on Hybrid and Electric Vehicles.
2. Identify safety precautions, location of vehicle high voltage circuit disconnect, and procedures to safely disable system.
3. Use appropriate tools, testing and measuring equipment to diagnose, test, inspect and perform preventive maintenance, service and repairs on Hybrid and Electric Vehicle systems and components.
4. Demonstrate an understanding of personal and environmental safety practices, and perform all tasks while observing all industry-standard safety practices.

AMT 173 : HEV III – Diagnostic and Repair

Credits: 3

Class Hours: 1 lecture and 6 lab

Prerequisites: "C" or higher in AMT 171 or automotive industry work experience with instructor's approval.

Recommended: Basic electrical knowledge of Ohm's Law and proper use of a DMM to determine voltage drop, shorts, opens, and resistance problems. Knowledge on basic theory of operation on automotive electrical and mechanical subsystems.

Description: This course is designed to familiarize the student with hybrid and electric vehicle safety, hybrid internal combustion engines (ICE), hybrid transmissions, parallel/series, power inverter system, AC induction electric machines, permanent magnet electric motors theory and construction, and battery pack construction. Hands-on application to safety disconnect, use of high voltage analysis tools to perform diagnostic tests on high voltage insulation failures, electric motor failures, battery failures, and differentiate between an ICE failure and an electric machine failure. Perform battery pack testing and reconditioning.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Identify high voltage circuits and systems on Hybrid and Electric Vehicles.
2. Identify safety precautions, location of vehicle high voltage circuit disconnect, and procedures to safely disable system.
3. Use appropriate tools, testing and measuring equipment to perform advanced diagnostics and repair on Hybrid and Electric Vehicle system failures.
4. Demonstrate an understanding of personal and environmental safety practices, and perform all tasks while observing all industry-standard safety practices.

AMT 177 : Automotive Diesel Fuel System

Credits: 2

Class Hours: 1 lecture and 3 lab

Prerequisites: "C" or higher in AMT 129 or automotive industry work experience with instructor's approval.

Recommended: Knowledge of basic theory on operations of automotive engines and fuel and emission systems.

Description: This course is designed to provide the student with technical knowledge and skill in servicing and troubleshooting the fuel injector system of the automotive diesel engine.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials and use appropriate tools, testing, and measuring equipment to diagnose, test, inspect, and perform needed repair/service on automotive diesel engine systems and components.
2. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
3. Demonstrate an understanding of applicable theories of operation and principles of automotive diesel engine systems.

AMT 240 : Fuel and Emission Systems

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 241.

Description: This course covers the principles of operation, diagnosis, and repair of fuel systems and emission systems. Carburetion, fuel injection, supercharging, turbocharging, fuel pumps, electronic control, and emission control systems are examined. Diagnostic and repair procedures are performed using automotive tools and testing equipment.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of fuel and emission systems.
2. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect and perform needed repair/service on fuel and emission systems and components.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 241 : Electrical/Electronic Systems II

Credits: 4

Class Hours: 8 lecture/lab

Prerequisites: "C" or higher in AMT 141.

Description: This course covers essential theories and practical skills in diagnosing electronic control systems, networking, and repairing automotive accessory circuits such as power windows, power door locks, power antennas, power mirrors, audio systems, anti-theft systems, power seats, horns, blower fan, and wiper/washer. Also covered are conventional instrumentation, digital instrumentation, supplemental inflatable restraint (SRS), and high voltage systems.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on electronic control systems, networking and components.
2. Demonstrate an understanding of applicable theories of operation and principles of electronic control systems.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 242 : Engine Performance I

Credits: 5

Class Hours: 10 lecture/lab

Prerequisites: "C" or higher in AMT 129 and AMT 240.

Description: This course covers diagnosis of engine mechanical systems, electrical systems, fuel system delivery (pumps, regulators), fuel injectors, ignition systems, and emission control systems using digital storage oscilloscopes, scanners, and various electronic testers.

Semester Offered: Fall

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of applicable theories of operation and principles of engine performance systems.
2. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect and perform needed repair/service on engine performance systems and components.
3. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.

AMT 244 : Engine Performance II

Credits: 5

Class Hours: 2 lecture and 9 lab

Prerequisites: "C" or higher in AMT 242.

Description: Computer engine management systems of domestic and foreign cars are studied in this course. Theories on operation, diagnosis and repair of sensors, actuators, and onboard computers are covered. The use of scanners, digital storage oscilloscopes, digital graphing multi-meters, and DVOMs are also covered.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect, and perform needed repair/service on engine performance computerized control systems and components.
2. Demonstrate an understanding of personal and environmental safety practices, and observe all industry standards of safety.
3. Demonstrate an understanding of applicable theories of operation and principles of engine performance computerized control systems.

AMT 260 : Diagnostic and Repair

Credits: 4

Class Hours: 1 lecture and 9 lab

Prerequisites: "C" or higher in AMT 144, AMT 145, AMT 149, AMT 152, AMT 154, and AMT 244.

Description: This course is designed to provide the student with realistic on-the-job types of training on automotive vehicles. Students will be exposed to different types of live jobs to build self-confidence, improve their approach to troubleshooting, and improve their skills of the trade with emphasis on accuracy, neatness, and speed.

Semester Offered: Spring

Course Student Learning Outcomes (CSLOs):

1. Demonstrate an understanding of personal and environmental safety practices and observe all industry standards of safety.
2. Demonstrate the use of reference training materials, use appropriate tools, testing and measuring equipment to diagnose, test, inspect and perform needed diagnostics and repair of systems and components in a live work environment.
3. Demonstrate an understanding of applicable theories of operation and principles of diagnostics and repair.