

2023-2024

NWKTC Catalog and Student Handbook

Automotive Technology

Description: The Automotive Technology program trains students in the basic fundamentals, necessary job skills, and related work procedures for employment in the automotive profession. Coursework includes use of technical service manuals; testing equipment; electronic ignition systems; rear, front and four-wheel drive; power steering; brakes; and electronics used in brakes, transmissions, steering systems, and a variety of other components. Students will use the latest in infrared engine analyzers and computerized diagnostic devices.

The auto tech shop is similar to repair bays in an automotive dealership. This enables students to work with the same type of tools and equipment they will find in industry. We schedule customer work that provides job training. Students are tasked with troubleshooting, looking up parts, figuring a job sheet, and interacting with customers. As advanced technology is introduced with new automobiles each year, our program is continually updated.

D Degree/Certificates awarded:

AAS

Tech Cert B, Tech Cert C

Accreditation/Certification:

ASE Educational Foundation (formerly NATEF)

Program Learning Outcomes:

Upon successful completion of this program, students will be able to:

- Accurately diagnose, repair and service suspension and steering systems.
- Diagnose and repair fuel injection and emissions system.
- Demonstrate the ability to troubleshoot and repair electronic systems and components.
- Diagnose and repair drive train system components and transmissions.
- Accurately diagnose, repair, and service brake systems.
- Service and repair heating and air-conditioning systems according to state, local, and federal guidelines.
- Diagnose and repair individual engine component systems.
- Demonstrate effective reading, writing, speaking, listening, and time management skills.
- Demonstrate mathematical skills.
- Operate basic computer programs.

Program Schedule:

Students will attend class and lab from 7:00 a.m. to 2:30 p.m., Monday through Friday.

Miscellaneous Notes:

This Automotive Technology program is certified in the eight required areas needed to meet the strict industry standards for Automotive Service Excellence (ASE) Master certification. ASE is a national non-profit organization which tests and certifies automotive repair technicians. The National Automotive Technicians Education Foundation (NATEF) has evaluated and approved our program for certification, meeting the standards of excellence in the following areas: Automatic Trans/Transaxle, Brakes, Electrical Systems, Engine Performance, Engine Repair, Heating and Air Conditioning, Manual Drive Train and Axles, Suspension and Steering. This certification program ensures that "top notch" technicians will be entering the work force.

PROGRAM GUIDE

FRESHMAN: FIRST SEMESTER

Course Name

Shop Orientation/Safety
 Suspension & Steering I
 Wheel Alignment Diagnosis & Repair
 Brakes I
 Brakes II*
 Tire
 Maintenance
 Technical Writing (or Communications Elective)
 Student Success Seminar (Required)

FRESHMAN: SECOND SEMESTER

Course Name

Electrical I
 Automotive Electronics
 Batteries Starting/Charging Systems
 Engine Performance I
 Engine Performance II
 Hybrid & Electric Vehicles*
 Computer Fundamentals (or Natural & Applied Science Elective)

SOPHOMORE: FIRST SEMESTER

Course Name

Manual Transmission, Clutches, & Transaxle Transfer Case Service I
 Automatic Transmissions & Transaxle Service I
 Automatic Transmission Service II
 Advanced Automatic Transmission Repair & Improvement*
 Personal Finance (Required)
 Technical Math or Technical Math w/review (or Math Elective)

SOPHOMORE: SECOND SEMESTER

Course Name

Advanced Engine Performance*
 Driveline Service & Rear Axle Diagnosis & Repair
 AC & Heating Ventilation Systems

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| Engine Diagnosis Skills & Replacement Cylinder Head & Valve Train Diagnosis & Repair Engine Block Assembly Diagnosis & Repair Lube/Cooling System Diagnosis & Repair Workplace Ethics (or Gen Ed Elective) |
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COURSE DESCRIPTIONS

AT 100 SHOP ORIENTATION & SAFETY

1 CR

This course introduces the new AT student to shop safety, policies, and procedures. Key concepts include personal safety and tool/equipment safety while repairing the automobile.

AT 110A SUSPENSION & STEERING I

3 CR

This course covers the types, construction, and uses of tires. It covers various tire problems, diagnosis, and correction of the problems. Wheel balance servicing and lubrication of the auto are thoroughly studied. This unit covers the various types of automotive frames, types of suspensions, identification of parts, and the proper repair of various types on front, rear, and four-wheel drive vehicles, including front drive half shaft universal repair.

AT 120 WHEEL ALIGNMENT DIAGNOSIS & REPAIR

4 CR

This course covers alignment angles, theory, application, and diagnosis of alignment problems. This includes practical experience on front-wheel drive, rear-wheel drive, and four-wheel drive vehicles. This course covers the construction, operation, adjustment, and diagnosis of automotive and light trucks on manual and power steering systems and related components.

AT 131 BRAKES I

3 CR

This course covers the theory and application of all the braking systems on the automobile. Students receive instruction on proper servicing and repair of conventional power, disc, anti-lock and hydro-boost brake systems.

AT 135 BRAKES II*

2 CR

This course covers the theory and application of antilock braking, traction control, and stability control systems on the automobile. Students receive instruction on proper servicing and repair of anti-lock brake systems and, traction control systems, and Stability control systems.

AT 137 TIRE MAINTENANCE

2 CR

Students are taught about tire maintenance through theory, service and repair.

AT 149 ELECTRICAL I

3 CR

Foundation for developing electronic skills begins with basic electrical theories and building circuits, using test meters, and making diagnostic measurements. This class will go through basic components, electronic devices, wiring diagrams and wiring repair.

AT 150A AUTOMOTIVE ELECTRONICS

2 CR

Foundation for developing electronic skills begins with basic electrical theories and building circuits, using test meters and scopes, and making diagnostic measurements. This class will go through basic components, electronic devices, wiring diagrams, and wiring repair.

AT 155A BATTERIES STARTING/CHARGING SYSTEMS

3 CR

This class will cover all aspects of the battery starting and charging systems. Included will be basic construction, service, and diagnosis.

AT 163 ENGINE PERFORMANCE I

3CR

This course covers the fundamentals of the ignition system starting with the operation of conventional and electronic to distributor less system. Diagnostic oscilloscopes and engine analyzers will be covered and the diagnosis problems that are ignition related.

AT 165 ENGINE PERFORMANCE II

3 CR

This unit covers the operation of emission control devices as well as the fuel system with primary emphasis on feedback carburetors and fuel injection systems. Fuel and emission diagnosis will be covered with the use of all diagnostic equipment such as scanners, analyzers and pressure testing equipment.

AT 175 ADVANCED ENGINE PERFORMANCE*

3 CR

This unit will build the foundation for modern drivability repair. The student will study the operation of the automotive computer system and learn fundamentals that will be needed to understand fuel and ignition systems. Instruction on sensors and actuators will be included and how to diagnose problems on these components. Computer self diagnosis and the use of scan tools will be stressed along with the Digital Volt Ohm Meter (DVOM) and the lab scope.

AT 211 MANUAL TRANSMISSION, CLUTCHES & TRANSAXLE TRANSFER CASE SERVICE I

3 CR

The beginning of the class will start with clutch service and diagnosis, disassembly, and reassembly of the manual transmission clutch in class and lab. Included are linkages and proper adjustment and practical experience repairing clutches. The transmission portion of the class will cover gear principles, torque, gear ratios, and mechanical advantage. The service diagnosis and repair of the manual transmission and transaxle will be primary focus. Included is practical experience with real shop atmosphere.

AT 221 AUTOMATIC TRANSMISSIONS & TRANSAXLE SERVICE I

3 CR

This course is an advanced lecture and shop experience covering all components of automatic transmissions and transaxles, their operation, repair and diagnosis, and repair of electronically shifted transmissions and their test equipment. As a group, we will rebuild one transmission and each pair of students will rebuild a transmission to dyno test install and road test.

AT 223 AUTOMATIC TRANSMISSION SERVICE II

4 CR

Building on the AT 221 transmission and transaxle course, this class will focus on the repair of the automatic transmission. This course is an advanced lecture and shop experience covering all components of an automatic transmission, its operation, repair and diagnosis, and repair of electronically shifted transmissions and their test equipment. This course will be made up of applying the basic information to rebuilding the automatic transmission. Transmissions will be removed, reconditioned, diagnosed, and repairs will be performed.

AT 225 ADVANCED AUTOMATIC TRANSMISSION REPAIR & IMPROVEMENT*

3 CR

This class will look at advanced repairs and transmission enhancements for performance and durability. Research will be done on different transmissions looking at modifications that are available.

AT 230 DRIVELINE SERVICE & REAR AXLE DIAGNOSIS & REPAIR

3 CR

This course will include drive shafts and rear differential assemblies. This includes: gear replacement and rear differential services. Also included will be the diagnosis of noises, vibration, leaks, and failures.

AT 250 AC & HEATING VENTILATION SYSTEMS

3 CR

Students will diagnose the heating system malfunctions. This will include the replacement of heater cores and servicing of mechanical and vacuum heater water valves. Students will learn the proper handling of refrigerants, correct use of air conditioning service valves, use of manifold gauge set, and sight glass. Students will diagnose and repair compressors, condensers, accumulators, and complete servicing of the air conditioning system. They also learn recharging methods on different air conditioning systems and will be ready to take the test to become certified for air conditioning service.

AT 255 ENGINE DIAGNOSIS SKILLS & REPLACEMENT

3 CR

Learning correct diagnostic procedures in analyzing engine problems is the main emphasis of this course. Included will be cylinder compression test, power balance test, and leakage test. Timing chain and gear and belt inspection will also be included.

AT 260A CYLINDER HEAD & VALVE TRAIN DIAGNOSIS & REPAIR

2 CR

This course covers in-depth valve train operating principles, service of camshaft drives, camshafts, lifters, valves, valve seats, valve guides, and related cylinder head components.

AT 270 ENGINE BLOCK ASSEMBLY DIAGNOSIS & REPAIR

3 CR

Instruction concerning bearing design, wear patterns and bearing failure, and reconditioning methods used to service cylinders, main bearing bores, crankshafts and block decks are covered in this course. Students learn about gaskets, seals, rings, pistons, connecting rods, and harmonic balancers.

AT 280A LUBE/COOLING SYSTEM DIAGNOSIS & REPAIR

2 CR

The first section of this course covers the lubrication system. Students will learn how oil is rated and the different types of oil, how the lubrication circuit and oil filtration works, oil pumps and system priming, and how the crankcase ventilation system works. The second half of the course is devoted to the engine cooling system. Topics covered are: radiators, water pumps, thermostats, belt and coolant hoses, and electronic and mechanical engine cooling fans.

AT 290 HYBRID & ELECTRIC VEHICLES*

3 CR

The student will learn the theory and operation of hybrid drive systems in the automobile. The content will cover batteries, charging, high voltage safety, transmission, inverter/converter operation, cooling systems, diagnosis and repair of these advanced and unique automobiles. The course will emphasize the importance of safety due to the deadly nature of the high voltage environment. Students are required to purchase their own high voltage class 0 gloves to participate in live lab experiences.