WORK PROCESSES SCHEDULE
AUTOMOTIVE TECHNICIAN SPECIALIST
"ENTRY LEVEL NON-EXPERIENCED TECH"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB – LEVEL 1

Description: Provide service, repair and maintenance on customer vehicles. Analyze vehicle problems and utilize troubleshooting techniques to determine the needed repair. Utilize hand tools, power tools, lifts and electronic metering devices. Inspect, remove and replace worn and defective parts according to manufactures vehicle scheduled maintenance.

Term: Competency-Based (estimated 650 to 1,000 hours) it is intended that after a combination of 650 to 1,000 hours of OJL including a minimum of 50 hours of related instruction, the apprentice will demonstrate competence in the skills outlined below. Select apprentices will be able to demonstrate competence and receive advanced placement in the program.

On-The-Job Learning: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on-the-job and will not necessarily be in the order listed. The times allotted to these various processes are the estimated times which the average apprentice will require to learn each phase of the occupation. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The suggested related instruction supplements on-the-job learning, follows the work process schedule.

Competencies **Approximate Hours**

A. Shop Safety, First Aid and Hazardous Waste Disposal.....220 - 335
   a. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
   b. Define the steps required to avoid fire in the shop.
   c. Demonstrate the proper selection and operation of a fire extinguisher.
   d. Identify the necessary steps for personal safety in the shop.
   e. Identify personal protective equipment such as safety glasses and explain their use in an automotive shop and the importance of that use.
   f. Demonstrate how to protect your hands from the hazards found in an automotive shop.
   g. Describe how to properly lift a heavy object and demonstrate the process.
   h. Demonstrate the safe use and proper maintenance of pneumatic and hydraulic tools including vehicle lifts.
   i. Identify, describe, and record all unsafe or potentially unsafe conditions or acts, environmental noncompliance, malfunctions, and health or industrial hygiene problems.

B. Suspension and Steering .....45 - 70
   1. Inspect power steering fluid levels and condition.
   2. Vehicle Alignment.

C. Brake.....145 - 225

1. Check master cylinder for internal and external leaks and proper operation; determine necessary action.
2. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
3. Select, handle, store, and fill brake fluids to proper level.
4. Flush hydraulic system.
5. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action.
6. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.

D. Engine Performance .....25 - 35

Identify and interpret maintenance issues per manufacture's scheduled maintenance.

E. Tire .....70 - 110

1. Demonstrate tire care maintenance.
2. Inspection and repair of tires.
3. Mounting, balancing and installation of tires.

F. Manufacture Vehicle Scheduled Maintenance .....145 - 225

1. Introduction to manufacture vehicle schedule maintenance of suspension and steering systems.
2. Introduction to manufacture vehicle schedule maintenance of brake systems.
3. Introduction to manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Introduction to manufacture vehicle schedule maintenance of engine performance system.
5. Introduction to manufacture vehicle schedule maintenance of tires.
6. Introduction to manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Minimum Hours of On-The-Job-Learning.....650 – 1,000

RELATED INSTRUCTION OUTLINE
AUTOMOTIVE TECHNICIAN SPECIALIST
"ENTRY LEVEL NON-EXPERIENCED TECH"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB – LEVEL 1

Description: The following related training outline identifies subject matter that must be mastered by the apprentice in order to successfully complete the program.

Core Skills **Minimum Hours**

A. Safety 10
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Demonstrate the correct use of safety equipment such as safety glasses, fire extinguishers and how to properly lift a heavy object.
3. Apply federal, state and local regulations when storing and disposing of chemical materials and waste.
4. How to safely use shop equipment.

B. Suspension and steering 10
1. Wheel Alignment Diagnosis Adjustment and Repair
2. Wheel and Tire Diagnosis and Repair.
3. Preparatory ASE Suspension & Steering Certification instruction.

C. Electrical/Electronic Systems 2
1. Battery Diagnosis and Service.

D. Brakes 10
1. Basic hydraulic system.
2. Basic drum brake system.
3. Basic disk brake system.
4. Preparatory ASE Brakes Certification instruction.

E. Tire 5
1. Tire care maintenance.
2. Tire inspection and repair.
3. Mounting, balancing and installation.
4. Introduction High Performance, Low Maintenance Monitors.

F. Manufacture Vehicle Scheduled Maintenance 13
1. Manufacture vehicle schedule maintenance of suspension and steering systems.
2. Manufacture vehicle schedule maintenance of brake systems.
3. Manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Manufacture vehicle schedule maintenance of engine performance system.
5. Manufacture vehicle schedule maintenance of tires.
6. Manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Total Approximate Hours 50

WORK PROCESSES SCHEDULE
AUTOMOTIVE TECHNICIAN SPECIALIST
"ENTRY LEVEL EXPERIENCED TECH"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 1

Description: Provide service, repair and maintenance on customer vehicles. Analyze vehicle problems and utilize troubleshooting techniques to determine the needed repair. Utilize hand tools, power tools, lifts and electronic metering devices. Inspect, remove and replace worn and defective parts according to manufactures vehicle scheduled maintenance.

Term: Competency-Based (estimated 650 to 1,000 hours) it is intended that after a combination of 650 to 1,000 hours of OJL including a minimum of 50 hours of related instruction, the apprentice will demonstrate competence in the skills outlined below. Select apprentices will be able to demonstrate competence and receive advanced placement in the program.

On-The-Job Learning: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on-the-job and will not necessarily be in the order listed. The times allotted to these various processes are the estimated times which the average apprentice will require to learn each phase of the occupation. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The suggested related instruction supplements OJL, follows the work processes schedule.

Competencies **Approximate Hours**

A. Shop Safety, First Aid and Hazardous Waste Disposal.....220 - 335
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Define the steps required to avoid fire in the shop.
3. Demonstrate the proper selection and operation of a fire extinguisher.
4. Identify the necessary steps for personal safety in the shop.
5. Identify personal protective equipment such as safety glasses and explain their use in an automotive shop and the importance of that use.
6. Demonstrate how to protect your hands from the hazards found in an automotive shop.
7. Describe how to properly lift a heavy object and demonstrate the process.
8. Demonstrate the safe use and proper maintenance of pneumatic and hydraulic tools including vehicle lifts.
9. Identify, describe, and record all unsafe or potentially unsafe conditions or acts, environmental noncompliance, malfunctions, and health or industrial hygiene problems.

B. Suspension and Steering .....45 - 70
1. Inspect power steering fluid levels and condition.
2. Vehicle Alignment.

C. Brakes.....145 - 225

1. Check master cylinder for internal and external leaks and proper operation; determine necessary action.
2. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
3. Select, handle, store, and fill brake fluids to proper level.
4. Flush hydraulic system.
5. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action.
6. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.

D. Engine Performance .....25 - 35

Identify and interpret maintenance issues per manufacture's scheduled maintenance.

E. Tire .....70 - 110

1. Demonstrate tire care maintenance.
2. Inspection and repair of tires.
3. Mounting, balancing and installation of tires

F. Manufacture Vehicle Scheduled Maintenance .....145 - 225

1. Utilize manufacture vehicle schedule maintenance of suspension and steering systems.
2. Utilize manufacture vehicle schedule maintenance of brake systems.
3. Utilize manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Utilize manufacture vehicle schedule maintenance of engine performance system.
5. Utilize manufacture vehicle schedule maintenance of tires.
6. Utilize manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Minimum Hours of On-The-Job-Learning..... 650 – 1,000

RELATED INSTRUCTION OUTLINE
AUTOMOTIVE TECHNICIAN SPECIALIST
"ENTRY LEVEL EXPERIENCED TECH"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB – LEVEL 1

Description: The following related training outline identifies subject matter that must be mastered by the apprentice in order to successfully complete the program. Due to the experience level of the apprentice a customized individual training program will be delivered utilizing the outline listed below.

Core Skills **Minimum Hours**

A. Safety
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Demonstrate the correct use of safety equipment such as safety glasses, fire extinguishers and how to properly lift a heavy object.
3. Apply federal, state and local regulations when storing and disposing of chemical materials and waste.
4. How to safely use shop equipment.

B. Suspension and steering
1. Wheel Alignment Diagnosis Adjustment and Repair.
2. Wheel and Tire Diagnosis and Repair.
3. Preparatory ASE Suspension & Steering Certification instruction.

C. Electrical/Electronic Systems
1. Battery Diagnosis and Service.

D. Brakes
1. Basic hydraulic system.
2. Basic drum brake system.
3. Basic disk brake system.
4. Preparatory ASE Brakes Certification instruction.
5. Introduction High Performance, Low Maintenance Monitors.

E. Tire
1. Tire care maintenance.
2. Tire inspection and repair.
3. Mounting, balancing and installation.

F. Manufacture Vehicle Scheduled Maintenance
1. Introduction to manufacture vehicle schedule maintenance of suspension and steering systems.
2. Introduction to manufacture vehicle schedule maintenance of brake systems.
3. Introduction to manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Introduction to manufacture vehicle schedule maintenance of engine performance system.
5. Introduction to manufacture vehicle schedule maintenance of tires.
6. Introduction to manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Total Approximate Hours 50

WORK PROCESSES SCHEDULE
AUTOMOTIVE TECHNICIAN SPECIALIST - TECH "C"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 2

Description: Provide service, repair and maintenance on customer vehicles. Analyze vehicle problems and utilize troubleshooting techniques to determine the needed repair. Utilize hand tools, power tools, lifts and electronic metering devices. Inspect, remove and replace worn and defective parts according to manufactures vehicle scheduled maintenance.

Term: Competency-Based (estimated 2,000 to 4,000 hours) it is intended that after a combination of 2,000 to 4,000 hours of OJL including a minimum of 144 hours of related instruction, the apprentice will demonstrate competence in the skills outlined below. Select apprentices will be able to demonstrate competence and receive advanced placement in the program.

On-The-Job Learning: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on-the-job and will not necessarily be in the order listed. The times allotted to these various processes are the estimated times which the average apprentice will require to learn each phase of the occupation. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The suggested related instruction supplements OJL, follows the work processes schedule.

Competencies **Approximate Hours**

A. Shop Safety, First-Aid and Hazardous Waste Disposal .....415 - 830
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Define the steps required to avoid fire in the shop.
3. Demonstrate the proper selection and operation of a fire extinguisher.
4. Identify the necessary steps for personal safety in the shop.
5. Identify personal protective equipment such as safety glasses and explain their use in an automotive shop and the importance of that use.
6. Demonstrate how to protect your hands from the hazards found in an automotive shop.
7. Describe how to properly lift a heavy object and demonstrate the process.
8. Demonstrate the safe use and proper maintenance of pneumatic and hydraulic tools including vehicle lifts.
9. Identify, describe, and record all unsafe or potentially unsafe conditions or acts, environmental noncompliance, malfunctions, and health or industrial hygiene problems.
10. Identify and define hazardous materials by chemical and physical properties, such as: color, corrosivity, density, flammability, reactivity, specific gravity, and toxicity.

B. Suspension and Steering .....230 - 465
1. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.
2. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.
3. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
4. Inspect power steering fluid levels and condition.
5. Vehicle Alignment.

C. Brakes.....750 - 1490

1. Identify and interpret brake system concern; determine necessary action.
2. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
3. Check master cylinder for internal and external leaks and proper operation; determine necessary action.
4. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
5. Select, handle, store, and fill brake fluids to proper level.
6. Bleed (manual, pressure, vacuum or surge) brake system.
7. Flush hydraulic system.
8. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
9. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action.
10. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
11. Remove, inspect, and install wheel cylinders.
12. Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action.
13. Remove, clean, and inspect pads and retaining hardware; determine necessary action.
14. Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
15. Remove and reinstall rotor.
16. Resurface rotors.

D. Electrical/Electronic Systems .....50 – 100

1. Diagnose battery condition.
2. Remove and replace battery.

E. Engine Performance .....45 - 95

1. Identify and interpret maintenance issues per manufacture's scheduled maintenance.

F. Tire .....140 - 280

1. Demonstrate tire care maintenance.
2. Inspection and repair tires.
3. Mounting, balancing and installation of tires.

G. Heating, Cooling and Air Conditioning.....90 - 185

1. Identification of heating and cooling components and system requirements and procedures.
2. IMACA Certification.

H. Manufacture Vehicle Scheduled Maintenance .....280 - 555

1. Utilize manufacture vehicle schedule maintenance of suspension and steering systems.
2. Utilize manufacture vehicle schedule maintenance of brake systems.
3. Utilize manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Utilize manufacture vehicle schedule maintenance of engine performance system.
5. Utilize manufacture vehicle schedule maintenance of tires.
6. Utilize manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Minimum Hours of On-The-Job-Learning..... 2,000 – 4,000

WORK PROCESSES SCHEDULE
AUTOMOTIVE TECHNICIAN SPECIALIST – SENIOR TECH "B"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB – LEVEL 3

Description: Provide service, repair and maintenance on customer vehicles. Analyze vehicle problems and utilize troubleshooting techniques to determine the needed repair. Utilize hand tools, power tools, lifts and electronic metering devices. Inspect, remove and replace worn and defective parts according to manufactures vehicle scheduled maintenance.

Term: Competency-Based (estimated 4,000 to 8,000 hours) it is intended that after a combination of 4,000 to 8,000 hours of OJL including a minimum of 288 hours of related instruction, the apprentice will demonstrate competence in the skills outlined below. Select apprentices will be able to demonstrate competence and receive advanced placement in the program.

On-The-Job Learning: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on-the-job and will not necessarily be in the order listed. The times allotted to these various processes are the estimated times which the average apprentice will require to learn each phase of the occupation. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The suggested related instruction supplements OJL, follows the work processes schedule.

Competencies **Approximate Hours**

A. Shop Safety, First Aid and Hazardous Waste Disposal.....420 - 840
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Define the special training and necessary First Aid Steps required to deal with Blood Borne Pathogens.
3. Identify, describe, and record all unsafe or potentially unsafe conditions or acts, environmental noncompliance, malfunctions, and health or industrial hygiene problems.
4. Identify and define hazardous materials by chemical and physical properties, such as: color, corrosivity, density, flammability, reactivity, specific gravity, and toxicity.

B. Suspension and Steering ..... 630 – 1,260
1. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.
2. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action.
3. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.
4. Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
5. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.
6. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.

C. Brakes.....840 - 1680

1. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
2. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).
3. Measure brake pedal height; determine necessary action.
4. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.
5. Inspect, test, and/or replace components of brake warning light system.
6. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
7. Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
8. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action.

D. Electrical/Electronic Systems ..... 850 – 1,700

1. Identify and interpret electrical/electronic system concern; determine necessary action.
2. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
3. Use wiring diagrams during diagnosis of electrical circuit problems.
4. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems.
5. Check electrical circuits with a test light; determine necessary action.
6. Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action.
7. Maintain or restore electronic memory functions.
8. Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.

E. Engine Performance .....420 - 840

1. Identify and interpret maintenance issues per manufacture's scheduled maintenance.
2. Diagnose abnormal engine noise or vibration concerns; determine necessary action.
3. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
4. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.

F. Tire .....105 - 210

1. Remove; replace High Performance, Low Profile monitoring systems.

G. Heating, Cooling and Air Conditioning.....735 – 1,470

1. Identification of heating and cooling components and system requirements and procedures.
2. Heating and cooling diagnostics/trouble shooting and repair.
3. Identification of Air Conditioning components and system requirements and procedures.
4. Air Conditioning diagnostics/trouble shooting and repair.
5. Identification and proper handling of refrigerant gasses.
6. Recovery/recycle of refrigerant.
7. IMACA Certification.

Minimum Hours of On-The-Job-Learning.....4,000 – 8,000

RELATED INSTRUCTION OUTLINE
AUTOMOTIVE TECHNICIAN SPECIALIST - SENIOR TECH "B"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 3

Description: The following related training outline identifies subject matter that must be mastered by the apprentice in order to successfully complete the program.

Core Skills **Minimum Hours**

A. Safety .....16 - 32
1. Identify and define hazardous materials.
2. Apply federal, state and local regulations when storing and disposing of chemical materials and waste.

B. Suspension and Steering .....32 - 64
1. Steering Systems Diagnosis and Repair.
2. Suspension Systems Diagnosis and Repair.
3. Wheel Alignment Diagnosis Adjustment and Repair.
4. Wheel and Tire Diagnosis and Repair.

C. Brakes .....24 - 48
1. Hydraulic System Diagnosis and Repair.
2. Power assists unit's diagnosis and repair.
3. Miscellaneous (Wheel bearings, parking brakes, electrical, etc) diagnosis and repair.

D. Electrical/Electronic Systems.....40 - 80
1. General/Electrical System Diagnosis.
2. Starting systems diagnosis and repair.
3. Charging systems diagnosis and repair.
4. Lighting systems diagnosis and repair.
5. ASE Electrical Certification instruction.

E. Engine Performance .....48 - 96
1. Intro to General Engine Diagnosis and repair.
2. Intro to Computerized Engine Controls Diagnosis and repair.
3. Intro to Ignition System Diagnosis and repair.
4. Intro to Fuel, Air induction and Exhaust systems diagnosis and repair.
5. Intro to Emissions Control Systems Diagnosis and Repair.
6. ASE Engine Performance Certification instruction.

F. Tire .....8 - 16
1. Basic maintenance, removal and installation of HPLM monitor tires.

G. Heating, Cooling and Air Conditioning .....72 - 144
1. Identification of heating and cooling components and system requirements and procedures.
2. Basic Heating and cooling diagnostics/trouble shooting and repair.
3. Identification of Air Conditioning components and system requirements and procedures.
4. Basic Air Conditioning diagnostics/trouble shooting and repair.
5. Identification and proper handling of refrigerant gasses.
6. Recovery/recycle of refrigerant.
7. Introduction to Air Conditioning refrigerant retrofits.
8. IMACA Certification.
9. ASE Heating & Air Conditioning Certification instruction.

H. Manufacture Vehicle Scheduled Maintenance .....48 - 96

1. Manufacture vehicle schedule maintenance of suspension and steering systems.
2. Manufacture vehicle schedule maintenance of brake systems.
3. Manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Manufacture vehicle schedule maintenance of engine performance system.
5. Manufacture vehicle schedule maintenance of tires.
6. Manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Total Approximate Hours .....288 - 576

RELATED INSTRUCTION OUTLINE
AUTOMOTIVE TECHNICIAN SPECIALIST - TECH "C"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 2

Description: The following related training outline identifies subject matter that must be mastered by the apprentice in order to successfully complete the program.

Core Skills **Minimum Hours**

A. Safety .....20 - 40
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage.
2. Demonstrate the correct use of safety equipment such as safety glasses, fire extinguishers and how to properly lift a heavy object.
3. How to safely and properly use vehicle hoist equipment.
4. How to safely use shop equipment.

B. Suspension and steering.....20 - 40
1. Steering Systems Diagnosis and Repair.
2. Suspension Systems Diagnosis and Repair.
3. Wheel Alignment Diagnosis Adjustment and Repair.
4. Wheel and Tire Diagnosis and Repair.
5. ASE Suspension & Steering Certification instruction

C. Brakes .....15 - 30
1. Drum Brake Diagnosis and Repair.
2. Disk Brake Diagnosis and Repair.
3. Miscellaneous (Wheel bearings, parking brakes, electrical, etc) diagnosis and repair.
4. ASE Brakes Certification instruction.

D. Electrical/Electronic Systems.....20 - 40
1. Introduction to general/electrical systems.
2. Battery Diagnosis and Service.
3. Introduction to charging system.
4. Introduction to lighting systems.
5. Preparatory ASE Electrical Certification instruction.

E. Engine Performance .....5 - 10
1. Engine related Services.
2. Preparatory ASE Engine Performance Certification instruction.

F. Tire .....20 - 40
1. Tire care maintenance.
2. Tire inspection and repair.
3. Mounting, balancing and installation.
4. Introduction to High Performance, Low Maintenance Monitors.

G. Heating, Cooling and Air Conditioning .....14 - 28

1. Introduction to heating and cooling components.
2. IMACA Certification.
3. Preparatory ASE Heating & Air Conditioning Certification instruction.

H. Manufacture Vehicle Scheduled Maintenance .....30 - 60

1. Manufacture vehicle schedule maintenance of suspension and steering systems.
2. Manufacture vehicle schedule maintenance of brake systems.
3. Manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Manufacture vehicle schedule maintenance of engine performance system.
5. Manufacture vehicle schedule maintenance of tires.
6. Manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Total Approximate Hours .....144 - 288

WORK PROCESSES SCHEDULE
AUTOMOTIVE TECHNICIAN SPECIALIST - LEAD TECH "A"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 4

Description: Provide service, repair and maintenance on customer vehicles. Analyze vehicle problems and utilize troubleshooting techniques to determine the needed repair. Utilize hand tools, power tools, lifts and electronic metering devices. Inspect, remove and replace worn and defective parts according to manufactures vehicle scheduled maintenance.

Term: Competency-Based (estimated 4,000 to 8,000 hours) it is intended that after a combination of 4,000 to 8,000 hours of OJL including a minimum of 288 hours of related instruction, the apprentice will demonstrate competence in the skills outlined below. Select apprentices will be able to demonstrate competence and receive advanced placement in the program.

On-The-Job Learning: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on-the-job and will not necessarily be in the order listed. The times allotted to these various processes are the estimated times which the average apprentice will require to learn each phase of the occupation. They are intended only as a guide to indicate the quality of the training being provided and the ability of the apprentice to absorb this training in an average amount of time. The suggested related instruction supplements OJL, follows the work processes schedule.

Competencies **Approximate Hours**

A. Shop Safety, First Aid and Hazardous Waste Disposal.....270 - 540
1. Identify shop hazards and explain the necessary steps to avoid personal injury or property damage
2. Identify and define hazardous materials by chemical and physical properties, such as: color, corrosivity, density, flammability, reactivity, specific gravity, and toxicity.
3. Apply federal, state, and local regulations when storing and disposing of chemical materials and waste and know where to find current information about implementing these regulations.

B. Suspension and Steering .....365 - 730
1. Disable and enable supplemental restraint system (SRS).
2. Remove and replace steering wheel; center/time SRS coil (clock spring).
3. Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
4. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.

C. Brakes.....275 - 550
1. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).
2. Measure brake pedal height; determine necessary action.
3. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action.

D. Electrical/Electronic Systems ..... 910 – 1,820

1. Identify and interpret electrical/electronic system concern; determine necessary action.
2. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
3. Diagnose electrical/electronic integrity for series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).
4. Use wiring diagrams during diagnosis of electrical circuit problems.
5. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems.
6. Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action.
7. Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine necessary action.
8. Maintain or restore electronic memory functions.
9. Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.
10. Check for module communication errors using a scan tool.

E. Engine Performance ..... 1,460 – 2,920

1. Identify and interpret engine performance concerns per manufacture technical information.
2. Identify and interpret maintenance issues per manufacture's scheduled maintenance.
3. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.
4. Diagnose abnormal engine noise or vibration concerns; determine necessary action.
5. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
6. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action.
7. Retrieve and record stored OBD I diagnostic trouble codes; clear codes.
8. Retrieve and record stored OBD II diagnostic trouble codes; clear codes.
9. Diagnose emissions or drivability concerns resulting from malfunctions in the computerized engine control system with no stored diagnostic trouble codes; determine necessary action.
10. Check for module communication errors using a scan tool.
11. Inspect and test computerized engine control system sensors, power train control module (PCM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.
12. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, and emissions concerns on vehicles with electronic ignition (distributor less) systems; determine necessary action.
13. Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, and emissions concerns on vehicles with distributor ignition (DI) systems; determine necessary action.
14. Inspect and test ignition coil(s); perform necessary action.
15. Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, and stalling, poor mileage, dieseling, and emissions problems on vehicles with carburetor-type fuel systems; determine necessary action.
16. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.

F. Tire .....90 - 180

1. Remove; replace High Performance, Low Profile monitoring systems.

G. Heating, Cooling and Air Conditioning .....630 - 1260

1. Heating and cooling diagnostics/trouble shooting and repair.
2. Identification of Air Conditioning components and system requirements and procedures.
3. Air Conditioning diagnostics/trouble shooting and repair.
4. Identification and proper handling of refrigerant gasses.
5. Recovery/recycle of refrigerant.
6. Air Conditioning refrigerant retrofits.
7. IMACA Certification.

Minimum Hours of On-The-Job-Learning ..... 4,000 – 8,000

RELATED INSTRUCTION OUTLINE
AUTOMOTIVE TECHNICIAN SPECIALIST - LEAD TECH "A"
O*NET-SOC CODE: 49-3023.02 RAIS CODE: 1034CB - LEVEL 4

Description: The following related training outline identifies subject matter that must be mastered by the apprentice in order to successfully complete the program.

Core Skills **Minimum Hours**

A. Safety .....20 - 40
1. Identify and define hazardous materials.
2. Apply federal, state and local regulations when storing and disposing of chemical materials and waste.

B. Brakes .....20 - 40
1. Power assist unit's diagnosis and repair.
2. Anti Lock brake system.

C. Electrical/Electronic Systems.....42 - 84
1. Starting system diagnosis and repair.
2. Gauges, warning devices and driver information systems diagnosis and repair.
3. Horn and wiper/washer diagnosis and repair.
4. Accessories diagnosis and repair.

D. Engine Performance .....55 - 110
1. General Engine Diagnosis.
2. Computerized Engine Controls Diagnosis and Repair.
3. Ignition System Diagnosis and Repair.
4. Fuel, Air induction and Exhaust systems diagnosis and repair.
5. Emissions Control Systems Diagnosis and Repair.

E. Tire .....11 - 22
1. Remove; replace High Performance, Low Profile monitoring systems.

F. Heating, Cooling and Air Conditioning .....75 - 150
1. Heating and cooling diagnostics/trouble shooting and repair.
2. Identification of Air Conditioning components and system requirements and procedures.
3. Air Conditioning diagnostics/trouble shooting and repair.
4. Identification and proper handling of refrigerant gasses.
5. Recovery/recycle of refrigerant.
6. Air Conditioning refrigerant retrofits.
7. IMACA Certification.

G. Manufacture Vehicle Scheduled Maintenance .....65 - 130
1. Manufacture vehicle schedule maintenance of suspension and steering systems.
2. Manufacture vehicle schedule maintenance of brake systems.
3. Manufacture vehicle schedule maintenance of electrical/electronic systems.
4. Manufacture vehicle schedule maintenance of engine performance system.
5. Manufacture vehicle schedule maintenance of tires.
6. Manufacture vehicle schedule maintenance of heating, cooling and Air Conditioning systems.

Total Approximate Hours .....288 - 576