

SCHOOLS OF AUTOMOTIVE TECHNOLOGY

AUTOMOTIVE TECHNOLOGY I

Course # 1087

Credits 6.25

September, 2017

I. COURSE DESCRIPTION:

This half-year course will introduce the students with the automotive industry. The examination of the job requirements and an outlook of opportunities for employment in automotive service and repair. Three full year courses will follow to complete the National Institute for Automotive Service Excellence (ASE), Maintenance and Light Repair (MLR) training program. A minimum of 540 hours of combined classroom and lab/on-vehicle service and repair activities will be completed by the end of the fourth year. Additionally, NATEF policy on its task list serves as a basis for course completion. Which is: Ninety-five percent (95%) of Priority 1 (P-1); eighty percent (80%) of Priority 2 (P-2); and fifty percent (50%) of Priority 3 (P-3) will be taught.

The students will demonstrate competency in both written and performance activities. This is a combination of workplace skills and a unique blend of academic and technical skills. Shop operation procedures and both shop and personal safety rules will be emphasized.

The students will identify, select, operate and maintain the hand tools of the automotive trade. They will identify, operate, maintain and store the equipment used on various automotive tasks such as: hydraulic jacks, safety stands, vehicle lifts, tire mounting and dismounting machines, tire/wheel balancing machines, battery chargers, battery testers, bench grinders, bench vises, parts washing machines, and grease lubricating guns.

The students will be able to set a vehicle lift in order to raise a vehicle safely. The students will raise a vehicle using a hydraulic jack safely and will place safety stands under a vehicle correctly to prevent any injury to themselves or cause any damage to the car or equipment.

Students will be introduced to Workplace Employable Skills. Both personality traits and work habits conducive to obtaining and maintaining employment will be stressed.

Information need to service a vehicle will be reviewed; students will be able to demonstrate concern, cause, and correct when preparing vehicles for service. Procedures for writing work orders properly will be examined as well as how to properly return the vehicle to the customer.

The students will perform routine scheduled maintenance services to vehicles such as: change engine oil and filter; lubricate moving parts as required by the manufacturer. The students will inspect and refill all fluids found in a vehicle.

The students will be able to identify high voltage cables on hybrid vehicles. The students will explain the power-down procedure before working on hybrid vehicles.

On-vehicle service and repair work is scheduled to benefit the students and supplement ongoing instruction on items specified in the NATEF task list. Students will have had instruction and practice on specific repair tasks prior to on-vehicle service and repair work. The primary source of on-vehicles for service and repair will include but not limited to vehicles donated by manufacturers, customer-owner vehicles, training student-owner vehicles and other vehicles. Industry-type completed work orders will be on or attached to all vehicles to be serviced.

UNIT 1

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
Unit Plan Title:	Careers, ASE Certification and Career Success		
NJSLS Standard(s) Addressed in this unit			
<p>8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.</p> <p>9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.</p> <p>9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.</p> <p>9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.</p> <p>9.3.ST-ET.5 Apply knowledge in Stem to solve problems</p> <p>3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p> <p>MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>CRP1. Act as a responsible and contributing citizen and employee.</p> <p>CRP2. Apply appropriate academic and technical skills.</p> <p>CRP3. Attend to personal health and financial well-being.</p> <p>CRP4. Communicate clearly and effectively and with reason.</p> <p>CRP5. Consider the environmental, social and economic impacts of decisions.</p> <p>CRP6. Demonstrate creativity and innovation.</p>			

- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

- What are the most common automotive careers and related fields of employment?
- What are the different skills required to become a qualified auto technician?
- What is the ASE certification program?
- What are the traits employers look for in their employees?
- What are the different types of repair facilities for vehicles?
- What are the different ways employees may be paid?
- How are job openings in the automotive field found?

Anchor Text

- Fundamentals of Automotive Maintenance and Light Repair, by Kirk T. VanGelder and Ian W. Andrew, Jones & Bartlett, Burlington, MA, 01803, 2015, ISBN# 978-1-284-05673-0
- Fundamentals of Automotive Maintenance and Light Repair Student Workbook, Kirk T. VanGelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07783-4
- Fundamentals of Automotive Maintenance and Light Repair Tasksheet Manual for NATEF Proficiency, Kirk T. Van Gelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07785-8

Short & Informational Texts (3-5)

- Modern Automotive Technology 8th edition, by James E. Duffy, The Goodheart-Willcox Company, Inc., Tinley Park, IL., 2014, ISBN# 978-1-61960-370-7
- Auto Upkeep: Basic Car Care, Maintenance, and Repair 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing , Ozark Missouri, 2013, ISBN# 978-1-62702-006-0
- Auto Upkeep: Basic Car Care, Maintenance, and Repair Workbook 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing , Ozark Missouri, 2013, ISBN# 978-1-62702-002-2

Expected Proficiencies of the Unit

List the traits employers look for.
Summarize the different systems used to pay technicians.
Explain the types of repair facilities.
Explain how to find job openings in the automotive field.
List the common automotive careers and related fields of employment.
Describe the specialized tasks completed by each type of auto technician.
Summarize the ASE certification program.
Workplace Employability Skills:
Reports to work daily on time; able to take directions and motivated to accomplish the task at hand.
Dresses appropriately and uses language and manners suitable for the workplace.
Maintains appropriate personal hygiene.
Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.
Demonstrates honesty, integrity and reliability.
Work Habits/ Ethic:
Complies with workplace policies/laws.
Contributes to the success of the team, assists others and requests help when needed.
Works well with all customers and coworkers.
Negotiates solutions to interpersonal and workplace conflicts.
Contributes ideas and initiatives.
Follows directions.
Communicates (written and verbal) effectively with customers and coworkers.
Reads and interprets workplace documents; writes clearly and concisely.
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.

Formative & Summative Assessments

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments

Summative: Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

Suggested Time Frame:	1-2 weeks
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UNIT 2

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
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Unit Plan Title:	SAFETY
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NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.

9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.

9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.

9.3.ST-ET.5 Apply knowledge in STEM to solve problems

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP3. Attend to personal health and financial well-being.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

- Why is it important to follow safe practices in the workplace?
- How does the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) impact the workplace?
- What is the difference between a shop policy and a shop procedure?
- How do shop policies, procedures, and safety inspections make the workplace safer?
- How are hazardous environments identified and what safety precautions should be taken in hazardous environments?
- What are some common workplace safety signs and what are their meanings?
- What are some standard safety equipment items that should be in the workplace?
- How is a safe level of air quality in the workplace maintained?
- What are some safety precautions to be taken when working with electrical tools and equipment?
- How can the shop layout contribute to efficiency and safety?
- How can the risk of fires in shop be reduced?
- How is firefighting equipment used?
- How are Safety Data Sheets (SDS) used?
- How is toxic dust managed?
- How is engine oil and fluids properly managed?
- What is the proper use and procedures for safe lift operations?
- What is the proper use and placement of floor jacks and jack stands?
- What are and does one properly use fender covers and floor mats?
- How are vehicles properly prepared for customer pickup?

Anchor Text

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Expected Proficiencies of the Unit

Shop and Personal Safety:

Identify general shop safety rules and procedures.

Utilize safe procedures for handling of tools and equipment.

Identify and use proper placement of floor jacks and jack stands.

Identify and use proper procedures for safe lift operations.

Utilize proper ventilation procedures for working within the lab/shop area.

Identify marked safety areas.

Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.

Identify the locations of eyewash stations.

Identify the locations of the posted evacuation routes.

Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.

Identify and wear appropriate clothing for lab/shop activities.

Secure hair and jewelry for lab/shop activities.

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 (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).

Locate and demonstrate knowledge of material data sheets (MSDS).

Use fender covers and mats.
 Lift and secure a vehicle with a floor jack and jack stands.
 Lift a vehicle using a two-post hoist and a four-post hoist.
 Prepare a vehicle for customer pickup.

Formative & Summative Assessments

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments
 Summative: Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

Suggested Time Frame: 3 Weeks

UNIT 3

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
Unit Plan Title:	Tools & Equipment and Measurement		
NJSLS/CCTC Standard(s) Addressed in this unit			
<p>8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.</p> <p>9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.</p> <p>9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.</p> <p>9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.</p> <p>9.3.ST-ET.5 Apply knowledge in Stem to solve problems</p> <p>3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p>			

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP3. Attend to personal health and financial well-being.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9. Model integrity, ethical leadership and effective management.

CRP10. Plan education and career paths aligned to personal goals.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

What are the primary parts within major automotive systems?

What are the frequent electronic interaction of major automotive systems or circuits?

What are the most important systems used to operate conventional and hybrid passenger vehicles and where are they located?

What are the common tools used in the automotive trade and how are they used, stored and maintained.

What are the most commonly used power tools and equipment and explain the safety rules that apply to them?

What the measuring systems used in the automotive trade and what tools are used to measure?

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Expected Proficiencies of the Unit

Tools and Equipment:

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 (i.e. micrometer, dial-indicator, dial-caliper).

Formative & Summative Assessments

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments

Summative: Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

Suggested Time Frame:

6 weeks

UNIT 4

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
Unit Plan Title:	Vehicle, Customer, Service Information, and Effective Communications		
NJSLS/CCTC Standard(s) Addressed in this unit			

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.

9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.

9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.

9.3.ST-ET.5 Apply knowledge in Stem to solve problems

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3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

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CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9. Model integrity, ethical leadership and effective management.

CRP10. Plan education and career paths aligned to personal goals.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

When completing a repair order what is the service requested and what information is required?

What is the purpose and use of labor guides?

What is the purpose and use of the owner's manuals and shop manual/service information?
What is the purpose and use of the parts program?
What is the purpose and application of VIN's?
How is the service history of the vehicle used?
How are the 3 Cs: concern, cause and correction applied in repairing and servicing vehicles.
What are the barriers to effective listening and what are the components of active listening?
What are the elements of effective speaking, including asking constructive questions and proper phone etiquette?
What are the elements of good customer service?
What are some effective writing or documentation techniques?
What are some effective reading and researching techniques?

Anchor Text

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Expected Proficiencies of the Unit

Use an owner's manual to obtain vehicle information.
Use a shop/ repair manual and/or information program while conducting a service or repair.
Use a parts program to identify and order the correct replacement parts for a service or repair.
Properly use a repair/work order to identify the information needed and the service requested.

Use a labor guide to estimate the cost or charge of conducting a service or repair.
 Use VINs when repairing and servicing vehicles; decode a North American VIN.
 Apply the 3 Cs (concern, cause, and correction) when repairing and servicing vehicles.
 Use effective strategies for listening, speaking, reading, and writing for completing a repair order, a shop or equipment inspection sheet, an accident report, and a vehicle inspection form.
 Properly identify faulty equipment

Formative & Summative Assessments

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments
 Summative: Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

Suggested Time Frame: 1 Week

UNIT 5

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
Unit Plan Title:	Fluids and Lubrication		
NJSL Standard(s) Addressed in this unit			
<p>8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.</p> <p>9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.</p> <p>9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.</p> <p>9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.</p> <p>9.3.ST-ET.5 Apply knowledge in Stem to solve problems</p>			

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP3. Attend to personal health and financial well-being.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9. Model integrity, ethical leadership and effective management.

CRP10. Plan education and career paths aligned to personal goals.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

Why and how are vehicle fluids checked?
Why is it important to maintain vehicle?
What are the safe practices while working with vehicle fluids?

Anchor Text

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Expected MLR Proficiencies of the Unit

I. Engine Repair

C. Lubrication and Cooling Systems

1. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine necessary action.

P-1

2. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.

P-1

3. Remove, inspect, and replace thermostat and gasket/seal.

P-1

4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required.

P-1

5. Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required.

P-1

6. Identify components of the lubrication and cooling systems.

P-1

ER Tasks	
P-1	12
P-2	2
P-3	1
P-3	1
	15

Formative & Summative Assessments

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments

Summative: Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)	
Suggested Time Frame:	3 weeks

UNIT 6

Content Area:	AUTOMOTIVE TECHNOLOGY I	Grade(s)	9
Unit Plan Title:	Service Information and Work Orders; Fasteners, Gaskets, Seals and Sealants, Tires		
NJSL Standard(s) Addressed in this unit			
<p>8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.</p> <p>9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.</p> <p>9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.</p> <p>9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.</p> <p>9.3.ST-ET.5 Apply knowledge in Stem to solve problems</p> <p>3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p>3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p> <p>MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <p>CRP1. Act as a responsible and contributing citizen and employee.</p> <p>CRP2. Apply appropriate academic and technical skills.</p> <p>CRP3. Attend to personal health and financial well-being.</p> <p>CRP4. Communicate clearly and effectively and with reason.</p> <p>CRP5. Consider the environmental, social and economic impacts of decisions.</p>			

- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence

Essential Questions (3-5)

- Why is it important to know how to use both written text and computer-based service manuals in the auto trade?
- How are fasteners, gaskets, seals, and sealants properly used?
- What are the different types and sizes of tires?
- What are valve stems, valve cores, lug nuts, lug studs and lug bolts?
- What are the safety procedures while servicing tires?

Anchor Text

- Fundamentals of Automotive Maintenance and Light Repair, by Kirk T. VanGelder and Ian W. Andrew, Jones & Bartlett, Burlington, MA, 01803, 2015, ISBN# 978-1-284-05673-0
- Fundamentals of Automotive Maintenance and Light Repair Student Workbook, Kirk T. Van Gelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07783-4
- Fundamentals of Automotive Maintenance and Light Repair Tasksheet Manual for NATEF Proficiency, Kirk T. Van Gelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07785-8

Short & Informational Texts (3-5)

- Modern Automotive Technology 8th edition, by James E. Duffy, The Goodheart-Willcox Company, Inc., Tinley Park, IL., 2014, ISBN# 978-1-61960-370-7
- Auto Upkeep: Basic Car Care, Maintenance, and Repair 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing , Ozark Missouri, 2013, ISBN# 978-1-62702-006-0
- Auto Upkeep: Basic Car Care, Maintenance, and Repair Workbook 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing , Ozark Missouri, 2013, ISBN# 978-1-62702-002-2

Expected Proficiencies of the Unit

Preparing Vehicles for Service:

Identify information needed and the service requested on a repair order.
 Identify purpose and demonstrate proper use of fender covers, mats.
 Demonstrate use of the three C's (concerns, cause, and correction).
 Review vehicle service history.
 Complete work order to include customer information, vehicle identifying information, customer concerns, related service history, cause, and correction.
 Preparing Vehicles for Customer:
 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

IV. SUSPENSION AND STEERING

D. Wheels and Tires

- 1. Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label. P-1
- 2. Rotate tires according to manufacturer's recommendations including vehicles equipped with tire pressure monitoring systems (TPMS). P-1
- 3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly. P-1
- 4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-1

- 5. Inspect tire and wheel assembly for air loss; determine necessary action. P-1
- 6. Repair tire following vehicle manufacturer approved procedure. P-1

- 7. Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps. P-1

- 8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure. P-1

SS	
Tasks	
P-1	29
P-2	6
P-3	1
	36

Formative: quizzes ,task sheets completion, homework, CDX on-line pre and post module assessments	
Summative: Tests both written and performance	
Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)	
Suggested Time Frame:	3 weeks

III. Instructional Strategies:

The Automotive Department incorporates an Experiential Learning Environment simulating a modern automotive dealership. Teacher examples of work ethics and habits, cooperative learning and teacher evaluation accent classroom lessons. Lectures are reinforced with the use of web-based automotive curricula; smartboards, modern testing and diagnostic equipment, vehicle components and actual vehicles supplement and enhance classroom instruction. Reinforcement of lessons are complemented with active student participation in a functioning automotive repair lab. Students are expected to demonstrate proficiency of associated NATEF Task lists as well as effective communication skills incorporating applied academics such as science, technology, language arts, analytical and math skills as tasks are completed.

IV. Scope and Sequence

SUPPLEMENTAL TASKS					
	Automotive Shop Safety	3	2	1	N
	1. Apply shop safety rules and procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Apply personal safety rules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Working with others in a shop environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Apply equipment safety rules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Practice equipment set up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Apply shop equipment maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Power and Hand Tools	3	2	1	N
	7. Hand tool identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. Practice hand tool safety and usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9. Perform tool maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10. Pneumatic tool identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11. Pneumatic tool safety and usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. Electric tool identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	13. Electric tool safe usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automotive Careers	3	2	1	N
	14. Understand automotive career options	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15. Explore automotive career options	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	16. Discover education paths available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	17. Identify certification programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	18. Working on communication skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	19. Understanding customer concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	20. Writing a work order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	21. Explain a work order to customer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	22. Using technical service publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	23. Develop oral skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Service Publications	3	2	1	N
	24. Identify common service publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	25. Utilize a service manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	26. Working with maintenance schedules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	27. Use manufacturer-based service bulletins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	28. Using a personal computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	29. Explore the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	30. Use multi-media based service programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	31. Find refill specifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Automotive Fasteners, Gaskets, and Sealants	3	2	1	N
	32. Recognize common Fasteners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	33. Understanding torque specs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	34. Using torque sequences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	35. Torque to yield technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	36. Remove old gaskets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	37. Apply sealants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	38. Repair threads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	39. Remove broken bolts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	40. Drill and tap threads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Vehicle Maintenance	3	2	1	N
	41. Identify different types of maintenance services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	42. Use service manuals to locate service points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	43. Service wheel bearings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	44. Clean and inspect wheel bearings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	45. Replace grease seals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	46. Repack wheel bearings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	47. Inspect under carriage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	48. Inspect hoses and belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	49. Reset tire pressures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	50. Rotate tires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	51. Change oil and filter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	52. Inspect fluid levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	53. Adjust fluid levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Tires and Wheels	3	2	1	N
	54. Demonstrate proper tire machine usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	55. Demonstrate wheel balancer usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	56. Perform proper wheel torque	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	57. Use of torque stix	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	58. Demonstrate proper vehicle lift points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	II. Engine Repair	3	2	1	N
	C. Lubrication and Cooling Systems				
P-1	1. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine necessary action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	2. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	3. Remove, inspect, and replace thermostat and gasket/seal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	5. Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	6. Identify components of the lubrication and cooling systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	III. SUSPENSION AND STEERING	3	2	1	N
	D. Wheels and Tires				
P-1	1. Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	2. Rotate tires according to manufacturer's recommendations including vehicles equipped with tire pressure monitoring systems (TPMS).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	5. Inspect tire and wheel assembly for air loss; determine necessary action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	6. Repair tire following vehicle manufacturer approved procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	7. Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P-1	8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The degree of competency of students is indicated by letter or number checked. The rating for each task reflects the **employability readiness**.

Rating Scale: **3 Mastered-** can work independently with no supervision

2 Requires Supervision- can perform job completely with limited supervision

1 Not Mastered- requires instruction and close supervision

N No Exposure- no experience or knowledge in this area

V. Complete List of Course Textbooks, Instructional Resources & Software

Fundamentals of Automotive Maintenance and Light Repair, by Kirk T. VanGelder and Ian W. Andrew, Jones & Bartlett, Burlington, MA, 01803, 2015, ISBN# 978-1-284-05673-0

Fundamentals of Automotive Maintenance and Light Repair Student Workbook, Kirk T. Van Gelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07783-4

Fundamentals of Automotive Maintenance and Light Repair Tasksheet Manual for NATEF Proficiency, Kirk T. Van Gelder, Jones & Bartlett, Burlington, MA, 01803, 2016, ISBN# 978-1-284-07785-8

Auto Upkeep: Basic Car Care, Maintenance, and Repair 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing, Ozark Missouri, 2013, ISBN# 978-1-62702-006-0

Auto Upkeep: Basic Car Care, Maintenance, and Repair Workbook 3rd Edition, by Michael E. Gray and Linda E. Gray, Rolling Hills Publishing, Ozark Missouri, 2013, ISBN# 978-1-62702-002-2

VI. Student Handout

This half-year course will introduce the students with the automotive industry. The examination of the job requirements and an outlook of opportunities for employment in automotive service and repair. Three full year courses will follow to complete the National Institute for Automotive Service Excellence (ASE), Maintenance and Light Repair (MLR) training program. A minimum of 540 hours of combined classroom and lab/on-vehicle service and repair activities will be completed by the end of the fourth year. Additionally, NATEF policy on its task list serves as a basis for course completion. Which is: Ninety-five percent (95%) of Priority 1 (P-1); eighty percent (80%) of Priority 2 (P-2); and fifty percent (50%) of Priority 3 (P-3) will be taught.

The students will demonstrate competency in both written and performance activities. This is a combination of workplace skills and a unique blend of academic and technical skills. Shop operation procedures and both shop and personal safety rules will be emphasized.

The students will identify, select, operate and maintain the hand tools of the automotive trade. They will identify, operate, maintain and store the equipment used on various automotive tasks such as: hydraulic jacks, safety stands, vehicle lifts, tire mounting and dismounting machines, tire/wheel balancing machines, battery chargers, battery testers, bench grinders, bench vises, parts washing machines, and grease lubricating guns.

The students will be able to set a vehicle lift in order to raise a vehicle safely. The students will raise a vehicle using a hydraulic jack safely and will place safety stands under a vehicle correctly to prevent any injury to themselves or cause any damage to the car or equipment.

Students will be introduced to Workplace Employable Skills. Both personality traits and work habits conducive to obtaining and maintaining employment will be stressed.

Information need to service a vehicle will be reviewed; students will be able to demonstrate concern, cause, and correct when preparing vehicles for service. Procedures for writing work orders properly will be examined as well as how to properly return the vehicle to the customer.

The students will perform routine scheduled maintenance services to vehicles such as: change engine oil and filter; lubricate moving parts as required by the manufacturer. The students will inspect and refill all fluids found in a vehicle.

The students will be able to identify high voltage cables on hybrid vehicles. The students will explain the power-down procedure before working on hybrid vehicles.

On-vehicle service and repair work is scheduled to benefit the students and supplement ongoing instruction on items specified in the NATEF task list. Students will have had instruction and practice on specific repair tasks prior to on-vehicle service and repair work. The primary source of on-vehicles for service and repair will include but not limited to vehicles donated by manufacturers, customer-owner vehicles, training student-owner vehicles and other vehicles. Industry-type completed work orders will be on or attached to all vehicles to be serviced.

Course Proficiencies: Upon successful completion of the requirements of this course, the student will be able to:

- A. Apply orientation procedures and shop rules.
- B. Develop proper attitudes concerning safety in the automotive shop and practice safety rules.
- C. Demonstrate the proper and safe use of basic hand tools of the trade and other specialized equipment used to perform specific hands-on tasks necessary in completing assigned shop projects.
- D. Outline the requirements and duties of many occupational careers commonly found in the automotive service and repair trade.
- E. Demonstrate proper communication skills including, listening, speaking, reading and business writing skills.
- F. Identify and use of commonly used service publications and manuals including computer-based material.
- G. Identify various fasteners and fastening devices commonly used in the automotive trade.
- H. Define various types of fluids and lubricates found on today's automobiles.
- I. Demonstrate proper techniques used to perform fluid checks.
- J. Develop proper skills needed to perform an oil/filter change.
- K. Distinguish the different types of tires and wheels commonly found on domestic and foreign make automobiles.
- L. Demonstrate the proper and safe use of the tire balancer and tire changing machines.