Courses of Study
For
Automotive Technology

Courses in the Ground Transportation

1. Ground Transportation Maintenance 177000
2. Ground Transportation Engine and Powertrain 177001
3. Ground Transportation Electrical/Electronics 177002
4. Automotive Braking, Suspension, and Steering System 177003
5. Ground Transportation HVAC 177004
6. Automotive Engine Performance 177006
7. Transportation Capstone 177023

CTPD 023

WEST SHORE CAREER -TECHNICAL DISTRICT
LAKEWOOD, OHIO 44107

Table of Contents
Automotive Technology
West Shore Career-Technical District

Acknowledgements 3

Recommendation of Advisory Committee 4

Resolution/Approval of Board 5

Lakewood City Schools/West Shore Mission Statements 6

Career and Technical Education Goals 7

Program Design 8-13

Ground Transportation Maintenance 14-28

Automotive Braking, Suspension, and Steering Systems 29-46

Ground Transportation Electrical/Electronics 47-60

Ground Transportation Engine and Power Train 61-75

Ground Transportation HVAC 76-86

Automotive Engine Performance 87-98

Transportation Capstone 99-137

Student Assessment Policy 138

Acknowledgements
Automotive Technology
West Shore Career - Technical District

Sincere appreciation goes to the following individuals for their assistance and cooperation in preparing this Automotive Technology program's course of study.

Lakewood Board of Education, Lakewood City Schools
Mr. Jeffrey Patterson, Superintendent, Lakewood City Schools
Mr. Keith Ahearn, Lakewood High School Principal
Linda E. Thayer, Coordinator, West Shore Career and Technical
Mr. Michael J. Szittai Automotive Technology Instructor

Automotive Technology Advisory Committee:
Benjamin Giuliano
Shawn Buehner
Vince Hall
Randy Meadows
Greg Merrill
Brian Siftar
Diane Kastelic
Michael Francu

For her helpful suggestions and encouragement: Donna Richmond, Retired Professor Kent State University

Recommendation of Advisory Committee
Automotive Technology
West Shore Career & Technical District

The Career & Technical Advisory Committee of the Automotive Technology Program, West Shore Career & Technical District, has reviewed this course of study and recommends it for use as the foundation for instruction in classroom, laboratory, and cooperative occupational experiences.

The developers of the course of study have considered local labor market needs and the school district's ability to offer specialized programs. The competencies found on the NATEF content standards for this program have been reviewed and accepted as being congruent with our school district's philosophy and student outcome measures.

We believe that this course of study adequately and correctly focuses upon the development of technical competencies, attitudes, values, and appreciation's critical to successful employment in the business realm.

After reviewing this document, we recommend that the Automotive Technology Course of Study be approved and adopted on May 11th, 2015

Randy Meadows

Greg Merrill

Brian Siftar

Diane Kastelic

Resolution
Automotive Technology
West Shore Career & Technical District

WHEREAS, the Automotive Technology advisory Committee of the Lakewood City Schools has reviewed the Automotive Technology Course of Study, and WHEREAS, the course of study is based upon the Career Content Standards Competencies for WHEREAS, the Automotive Technology Advisory Committee has reviewed these competencies and has edited competencies to address local labor market needs, and to acknowledge the school district's ability to offer specialized programs,

Ground Transportation Maintenance 177000
Ground Transportation Engine and Powertrain 177001
Ground Transportation Electrical/Electronics 177002
Automotive Braking, Suspension, and Steering System 177003
Ground Transportation HVAC 177004
Automotive Engine Performance 177006
Transportation Capstone 177023

NOW, THEREFORE, BE IT RESOLVED, in accordance with the superintendent's recommendation, that the *Lakewood City Schools* adopt the Automotive Technology Course of Study.

Approval date: 6-15-15

Jeffrey W Patterson
Superintendent

Erma Lottie Barnes
Board President

Mission Statements
Automotive Technology
West Shore Career and Technical Education District

Mission of Lakewood City Schools

In partnership with our families and community, Lakewood City Schools will develop responsible citizens, who are critical and creative thinkers, committed to life-long learning, invested in a diverse society, and prepared for technological and global opportunities.

West Shore Career Technical District Mission Statement

The many enhancements to the West Shore Career-Technical District facility, technology, and curriculum support the ongoing mission of our teachers, administration, and staff to provide excellent educational opportunities and meaningful real-world experiences while preparing students for success in the global marketplace of the 21st century.

Career and Technical Education Goals
Automotive Technology
West Shore Career and Technical Education District

- Offer relevant, hands-on learning opportunities which align with student career interests and regional workforce development needs
- Prepare career-tech student for post-secondary opportunities or to directly enter the workforce.
- Maintain active advisory committees which offer overall curriculum direction and specific occupational knowledge of competencies required for each industry specific committee
- Offer career exploration opportunities to expose students to career
- Upgrade career-technical labs to align with industry standards
- Provide on-going industry training and development opportunities for career-tech staff to stay abreast of industry advancements and teaching methods.

Program Design
Automotive Technology
West Shore Career and Technical Education District

Program Philosophy

We believe the demands of modern society and the needs and interest of our youth necessitate an educational program designed to prepare students for productive citizenship in the world of work. We believe the Automotive Technology Program should aim to foster through technical instruction and applied academics fully functioning individuals who possess employability and reasoning skills, as well as technical expertise. We believe that the skills developed in the Automotive Technology program provide the student with a positive outlook and attitude about themselves, the workplace and society. We believe that as one develops personal, employability and technical skills, they also develop self-esteem, goal setting, desire for life-long learning and pride in accomplishment.

Program Goals

1. The primary goal of the Automotive Technology program is to prepare youths to enter and remain in the work force. This goal, surpassing training, includes providing the following:

- Career Enhancement Skills
- Integrated Academic Foundations
- Communication
- Leadership and Teamwork
- Safety, Health and Environment
- Legal Aspects
- Ethics
- Physical Aptitudes
- Problem Solving and Critical Thinking
- Tools and Equipment
- Apprenticeship & Skilled Trades Careers

2. To prepare students for entry level jobs in the automotive field by developing skills and related knowledge associated with carpentry.
3. To develop in every student the knowledge and skill in the use of proper tools and equipment.
4. To develop every student's maximum intellectual potentials in Math, Science, English and communication.
5. To provide the opportunity for individuals to obtain additional academic skills to further their CTE and personal skills.
6. To teach individuals safety standards enabling them to recognize work hazards and develop safe work habits.
7. To develop a sense of pride and self-worth in students through their acquiring a high standard of craftsmanship.
8. To stimulate the development of leadership qualities.
9. To develop ability to cooperate with other workers in the transportation field.
10. To develop ability to solve problems.

Overview of Program

The Automotive program is a two-year program consisting of 7 Career Field Pathways designed for 11th and 12th grade students. The program curriculum is based on the Northeast Ohio Tech Prep Consortiums Technical Competency Profiles for Automotive. This curriculum is the result of a comprehensive review and refinement of the State's TCP for Automotive Technology.

Students are encouraged to take the right classes so that they are prepared for their next step in life. The following pathway chart is a recommended sequence for students interested in this career field.

Ohio | Department of Education

2015-2016 Program of Study

Ohio Career-Technical Education

School District Name	Lakewood City SD
School Building	Lakewood High School
Postsecondary Name	
Postsecondary Campus	

Career Pathway: T9 Ground Transportation

Secondary Program Name: Auto Technology

Postsecondary Program Name:

Courses with Secondary and Postsecondary Credits

Secondary	9	English 9 (RA)	Health (RA)	Physical Education (RA)	Algebra 1(RA)	Ground Transportation Engine and Power Train (CTE)	Digital Media (RE)	Foreign Language (RE)		Secondary
	10	English 10 (RA)	World History (RA)	Fine Art (RA)	Geometry (RA)	Ground Transportation Electrical/Electronics (CTE)	Into to Computers (RE)	Foreign Language (RE)		
	11	English 11 (RA)	US History (RA)	Computer Programing (RE)	Physics (RA)	Automotive Braking, Suspension, and Steering Systems(CTE)	Ground Transportation Maintenance(CTE)	Personal Finance (RA)		
	12	English 12 (RA)	Government (RA)	Social Studies Elective (RE)	Chemistry (RA)	Automotive Engine Performance(CTE)	Transportation Capstone (CTE)	Ground Transportation HVAC (CTE)		
Postsecondary	Year 1 1st Sem									Postsecondary
	Year 1 2nd Sem									
	Year 2 1st Sem									
	Year 2 2nd Sem									

Please include the course codes as shown below (case sensitive). Ex: Automotive Brakes (CTE)

(CTE) Required Technical Courses	(CC) Courses with College Credit Opportunities	(RA) Required Courses	(RE) Recommended Elective Courses	(SC) Single CTE Courses

In the 11th and 12th grade component of the Tech Prep program, all students are part of a seamless curriculum, which allows student to transition into post-secondary programs. Each competency and competency builder in the required curriculum is designated to be introduced, reinforced, or mastered at various levels.

The basic instructional philosophy for the Tech Prep programs encourages project-based learning. An advisory committee comprised of representatives from business and industry, program graduates and academic representatives from school meets twice each year to provide input and guidance in this program.

Throughout the school year, students participate in a variety of work-based learning in order to observe and interact with customers and other trades people in order to learn more about the industry as a whole. Early placement and job shadowing are examples of work-based opportunities.

Population Served

All students who are interested in pursuing employment in the automotive field or in pursuing postsecondary education leading to employment in the transportation industry may enroll. Educationally, economically and/or physically disadvantaged students are mainstreamed unless disability prevents a student from benefiting from the program or creates a significant safety hazard to self or others. Tech Prep programs are open to all 11th and 12th grade students who have completed Algebra I. Students must complete Algebra 2 by the time they graduate from high school. To receive college credit students must maintain a 3.0 GPA in their Tech Prep programs and an overall GPA of 2.0 and maintain a 95% attendance rate.

Housing of the Program

The program comprises classroom and laboratory experiences in local school facilities that meet state standards with equipment of current industry standards. Real-life automotive projects are also conducted as part of a live and working shop when the task meets the specific curriculum.

Supervisor of the Program

The teacher of the Automotive Technology program reports directly to the West Shore Career and Technical Director and building principal.

Occupations Addressed

High School Exit Careers	Associate Degree Exit Careers	Baccalaureate Degree Exit Careers
Automotive Technician-Entry level	Service writer	Service Manager General Manager Owner
Lube Technician	Assistant Service Manager	ASE Certified Technician
Tire Technician	ASE Certified Technician	ASE Certified Technician
Automotive Parts Specialist	Parts Manager	General manager

Basic Program Operation

The Automotive Technology program is a hands-on learning experience consisting of related and laboratory work. There are 7 Pathways classes over 2 academic school years. The seniors have the ability for work placement in the second semester of their senior year if the appropriate criteria are met.

Field experience and/or early placement

Field experience is an integral part of each student's program provided through in-school laboratory and out-of-school entrepreneurship and job-placement experiences. These experiences are cooperatively planned by the teacher, student, parents and employer and operate under a training plan. The instructor supervises the experiences and expects students to keep appropriate records of experiences and competencies gained. Early placement is available in the 2nd semester of the students' senior year.

Articulation Agreements

Articulation agreements have been developed between West Shore Career and Technical Education District, Cuyahoga Community College and other College/Universities following Automotive Technology Career Technical Assurance Guide (CTAG). There is on-going dialogue following the established process and procedures between our school and each participating post-secondary institution to develop and maintain articulation agreements. The procedure can include post-secondary options, waiver of classes or other formats providing time-shortened or advanced skill associate degree paths.

Career Technical Credit Transfer (CT)²
Automotive Technology Career Technical Assurance Guide (CTAG)

The following programs/courses, indicated by Career Technical Articulation Number (CTAN), are eligible for granted college credit at the state institutions of higher education for (CT)2 approved programs/courses at adult career-technical education institutions and public secondary career-technical institutions. In addition, the following courses are eligible for transfer among approved programs/courses at state institutions of higher education.

CTAUT005 Introduction to Automotive Service and Repair Credits: 2 Semester Hours

In order to access college credit for this CTAN, **secondary students** must:
1. Successfully complete Ground Transportation Maintenance (ODE Course 177000)
2. Pass the ASE/NATEF Student Certification Examination for Maintenance and Light Repair (MLR) or Automobile Service and Technology (AST) and seek credit within two years from the date the examination was taken

Integrated Academics

Math, science, English and communication concepts are considered an essential and integral part of the program competencies and are provided by the academic staff.

Technology

Technology is an integral part of the Automotive Technology program. The curriculum promotes knowledge and principles and development of skills in automotive technology. The program integrates the use of technological advancements through teacher demonstrations, as well as student projects identified to become efficient at home and at work.

Student Leadership

Participation in the Ohio Skills USA organization and Leadership Academy is an integral part of the in-school instructional program and is included in the curriculum. Students are encouraged to participate in out-of-school experience opportunities to increase their competence in leadership, citizenship, cooperation and communication. Skills USA provides opportunities for each student to participate in meeting and leadership activities at the local, state and national levels.

Critical Thinking and Decision Making

Developing and using critical-thinking skills to make wise decisions is an integral part of classroom instruction and laboratory learning activities. Students learn decision-making techniques through the "problem-solving" approach. Problem solving includes the identification of options, the selection and testing of an option, and determination of a solution or conclusion. Conflict resolution is another essential element of the program.

Disclaimer Statement

This Course of Study conforms to all federal, state and local laws and regulations including Title IX and nondiscrimination against any student because of race, color, creed, sex, religion, citizenship, economic status, married status, pregnancy, handicap, other physical characteristics, age or national origin. This policy of nondiscrimination shall also apply to otherwise qualify handicapped individuals.

ASE REQUIRED TASKS

For every Pathways there may or may not be an ASE task that fits or relates to the specific task, but as an instructor of an ASE program, it is my duty and obligation to present this material to the instructed class. During the instruction of these tasks, the following safety requirements will be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

SCOPE and SEQUENCE

for

Ground Transportation Maintenance

177000

In this first course, students will apply skills needed to inspect and perform general service on vehicles. Students will research applicable service information and technical service bulletins, and perform maintenance on vehicles. Students will inspect and service engine, drive train, suspension, steering, electrical and braking systems. Students will perform ignition maintenance including spark plug/ glow plug and ignition wire and coil pack replacement. Additionally, students change fluids, filters and inspect vehicles for leaks and fluid condition.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

SCOPE and SEQUENCE
Ground Transportation Maintenance
177000
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 1. Reports to work daily on time; able to take directions and motivated to accomplish the task at hand. 2. Dresses appropriately and uses language and manners suitable for the workplace. **1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism.

	1.1.9. Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. 1.1.10. Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction). 1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	1.2 *Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.2.1. Extract relevant, valid information from materials and cite sources of information. 1.2.2. Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers 1.2.3. Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.4. Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.6. Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers 1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. 1.2.8. Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers.

	1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity). 1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2. Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 ***Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions.

	1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance. 1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.8. Verify compliance with computer, copyright, and intellectual property laws and regulations. 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). 1.4.2. Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 1.4.3. Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 1.4.4. Use system hardware to support software applications. 1.4.5. Use information technology tools to maintain, secure, and monitor business records. 1.4.6. Use electronic database to access and create business and technical information. *(CTAG) 1.4.7. Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). 1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.5.1. Describe how cultural understanding, cultural intelligence skills, and continual awareness are interdependent. 1.5.2. Describe how cultural intelligence skills influence the overall success and survival of an organization. 1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.6. Analyze work tasks for understanding and interpretation from a different cultural perspective. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Contributes to the success of a team, assists others and requests help when needed. 1.5.8. Identify how multicultural teaming and globalization can foster development of new and improved products and services and recognition of new opportunities. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.*
Competencies	1.6.1. Identify business opportunities. 1.6.2. Assess the reality of becoming an entrepreneur, including advantages and disadvantages (e.g., risk vs. reward, reasons for success and failure). 1.6.3. Explain the importance of planning your business. 1.6.4. Identify types of businesses, ownership, and entities (i.e., individual proprietorships, partnerships, corporations, cooperatives, public, private, profit, not-for-profit). 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.6. Identify the target market served by the organization, the niche that the organization fills, and outlook of the industry. 1.6.7. Identify the effect of supply and demand on products and services. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.10. Describe the impact of globalization on an enterprise or organization.

	1.6.11. Describe how all business activities of an organization work within the parameters of a budget. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	1.9. *Financial Management/ Use financial tools, strategies, and systems to develop, monitor, and control the use of financial resources to ensure personal and business financial well-being.*
Competencies	1.9.1. Create, analyze, and interpret financial documents (e.g., budgets, income statements). 1.9.2. Identify tax obligations 1.9.3. Review and summarize savings, investment strategies, and purchasing options (e.g., cash, lease, finance, stocks, bonds). 1.9.4. Identify credit types and their uses in order to establish credit. 1.9.5. Identify ways to avoid or correct debt problems. 1.9.6. Explain how credit ratings and the criteria lenders use to evaluate repayment capacity affect access to loans. 1.9.7. Review and summarize categories (types) of insurance and identify how insurances can reduce financial risk. 1.9.8. Identify income sources and expenditures. 1.9.9. Compare and contrast different banking services available through financial institutions. 1.9.10. Identify the role of depreciation in tax planning and liability.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 1. Identify general shop safety rules and procedures. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG) 2.1.5. Identify the reason to use ground fault interrupter circuits (GFCIs), sources of electrical hazards and established shutdown and lock-out/tag-out procedures. *(CTAG) 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.8. Identify procedures for handling, storage and disposal of hazardous materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws.

	2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8. Identify the location of eye wash stations 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.10. Describe the interactions of incompatible substances in measuring and mixing chemicals.*(CTAG) 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.14. Inspect air and exhaust systems, intake filters, fans and other mechanical components. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 3. Identify and use proper placement of floor jacks and jack stands. 4. Identify and use proper procedures for safe lift operation. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.4. Identify workplace risk factors associated with repetitive motion and lifting, operating and moving heavy objects. *(CTAG) 2.2.5. Demonstrate appropriate body mechanics in lifting and moving heavy objects. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	**2.3.** ***Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** ***(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**2.3.1.** Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. 2. Identify standard and metric designation. **2.3.2.** Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG) **2.3.3.** Operate power tools and stationary equipment in accordance with established procedures and safety standards. *(CTAG) **2.3.4.** Ensure the presence and functionality of safety systems and hardware. *(CTAG) **2.3.5.** Clean, lubricate and adjust power tools and stationary equipment. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 4. Demonstrate proper cleaning, storage, and maintenance of tools and equipment.

Outcome/I Can	**2.4.** ***General Maintenance/ Provide general maintenance to mechanical systems.*** ***(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **2.4.1.** Inspect for leakage at seals, gaskets, and bushings. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) In-Vehicle Transmission and Transaxle Repair: 2. Inspect for leakage; replace external seals, gaskets, and bushings. P-2 ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 5. Install engine covers using gaskets, seals, and sealers as required. P-1

2.4.2. Inspect fluid levels and fluid conditions on all mechanical systems.
ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE)
General: Transmission and Transaxle Diagnosis:
3. Diagnose fluid loss and condition concerns; determine necessary actions. P-1

2.4.3. Select engine, powertrain, power steering, and brake system fluids based on characteristics and applications.
ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering System Diagnosis and Repair:
9. Determine proper power steering fluid type; inspect fluid level and condition. P-1

2.4.4. Describe characteristics of engine fuels and fuel additives.

2.4.5. Perform engine oil and filter change.*(CTAG)
ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis:
10. Perform engine and oil filter change. P-1

2.4.6. Replace fuel filters.
ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:
3. Replace fuel filter(s). P-1

2.4.7. Flush and fill engine cooling system.
ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:
4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. P-1

2.4.8. Inspect, service, or replace air filters, filter housings, and intake ductwork.
ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:
4. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1

2.4.9. Drain and replace drivetrain fluids and filters.
ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE)
In-Vehicle Transmission and Transaxle Repair:
4. Drain and replace fluid and filter(s). P-1

2.4.10. Flush, fill, and bleed power steering system and replace filters. *(CTAG)
ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering System Diagnosis and Repair:
10. Flush, fill, and bleed power steering system. P-2

2.4.11. Flush, fill, and bleed brake system.
ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
12. Bleed and/or flush brake system. P-1

2.4.12. Store mechanical systems fluids and waste products.

2.4.13. Inspect and replace drive belts.
ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:
3. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1

2.4.14. Identify the sources of air conditioner (A/C) system odors.
ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Operating Systems and Related Controls Diagnosis and Repair:
7. Inspect the source of A/C system odors. P-2

2.4.15. Inspect and service battery and battery cables, connectors, clamps, and hold downs. *(CTAG)
ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service:
4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1

	2.4.16. Inspect interior and exterior lamps and sockets. **2.4.17. Verify operation of instrument panel gauges and warning/indicator lights and reset maintenance indicators.** ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Removal and Reinstallation (R&R): 3. Verify operation of the instrument panel engine warning indicators. P-1 **2.4.18. Verify windshield wiper and washer operations, replace wiper blades, and refill washer reservoir (where applicable).** **2.4.19. Inspect, repair to industry standards, and rotate tires and reset the tire pressure monitor system (TPMS). *(CTAG)** **2.4.20. Lubricate all suspension and chassis grease fittings and body lubrication points *(CTAG)** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**3.5. *Lubrication and Cooling Systems/ Inspect lubrication and cooling systems operation.*** ***(CTAG) [Perform a cooling system basic inspection, flush and fill on a vehicle]*** ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **3.5.7. Test, drain, flush and refill coolant and bleed the cooling system. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 6. Remove and replace radiator. P-2 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.6. *Batteries/ Diagnosis and service batteries.* *(CTAG) [Perform starting and charging system inspection and test] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 4.6.2. Test battery performance using state-of-charge and conductance tests and record test results. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 1. Perform battery state-of-charge test; determine necessary action. P-1 4.6.5. Perform a battery charge. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 5. Perform slow/fast battery charge according to manufacturer's recommendations. P-1 4.6.6. Start a vehicle using jumper cables and a battery or auxiliary power supply using manufacturer's jumping techniques and precautions. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1 4.6.7. Remove and replace a battery. ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.8. *Lighting and Accessories/ Identify, inspect, and replace electrical and electronic components of lighting systems and accessories.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 4.8.2. Inspect, replace and aim headlights and bulbs. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Lighting System Diagnosis and Repair: 3. Aim headlights. P-2 4.8.3. Identify and inspect incorrect turn signal or hazard light operation. 4.8.5. Identify system voltage and safety precautions associated with (HID) high-intensity discharge headlights.

	4.8.7. Identify incorrect horn operation. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair: 1. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action. P-1 **4.8.8. Identify incorrect wiper and washer operation and replace.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair: 2. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2 3. Diagnose (troubleshoot) windshield washer problems; perform necessary action. P-2 ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair: 10. Verify windshield wiper and washer operation, replace wiper blades. P-1 **4.8.9. Identify incorrect operation of motor-driven accessories.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair: 1. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action. P-2 **4.8.11. Identify incorrect electric lock operation and repair.** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.1.** ***Automatic Transmission and Transaxle Performance/ Identify, inspect, adjust, and replace automatic transmissions and transaxles.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 1. Indentify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action. P-1 ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) In-Vehicle Transmission/Transaxle Maintenance and Repair: 1. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. P-2 3. Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harness. P-1

	5.1.1. Research applicable vehicle and service information (e.g., transmission and transaxle system operation, fluid type, vehicle service history, service precautions, technical service bulletins). ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 2. Research applicable vehicle and service information fluid type, vehicle service history, service precautions, and technical service bulletins. P-1 **5.1.2.** Locate and interpret vehicle and major component identification numbers (i.e., vehicle identification number [VIN], vehicle certification labels, calibration decals). **5.1.3.** Investigate fluid loss and condition concerns. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 4. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1 **5.1.6.** Inspect for leaks on cooler lines and fittings. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) Off-Vehicle Transmission/Transaxle Repair: 2.Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.8.** ***Wheels and Tires/ Identify, inspect, and replace wheel and tire components and assemblies.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 5. Diagnose tire pull problems: determine necessary. P-2 7. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-2 8. Inspect tire and wheel assembly for air loss; perform necessary action. P-1 9. Repair tire using internal patch. P-1 **5.8.1.** Identify tire wear patterns and tire construction. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 1. Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action. P-1 3. Rotate tires according to manufacturer's recommendations. P-1

	5.8.2. Identify bearing noises and wheel vibration, shimmy, and noise. ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary actions. P-3 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 2. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action. P-2 **5.8.3. Measure wheel, tire, axle, and hub run-out.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 4. Measure wheel, tire, axle flange, and hub runout; determine necessary action. P-2 **5.8.4. Balance wheel and tire assembly.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 6. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). P-1 **5.8.5. Remove, inspect, and reinstall tire and wheel assembly and calibrate tire pressure monitoring system.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 10. Identify and test tire pressure monitoring system (indirect and direct) for operation; verify operation of instrument panel lamps. P-2 11. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. P-1 **5.8.6. Inspect and replace wheel studs.** ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 4. Install wheel and torque lug nuts. P-1 ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 7. Inspect and replace wheel studs. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Drive Axles: 1. Inspect and replace drive axle wheel studs. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Automotive Braking, Suspension, and Steering Systems

177003

Students will perform inspections, troubleshoot malfunctions and service automotive undercarriage systems. Students will identify poor performing hydraulic brake systems and replace malfunctioning components. Students will install coil and leaf springs, shock absorbers and struts, and replace wheel bearings. Students will inspect and replace automotive steering components and perform wheel alignments. Additionally, students will disable and enable supplemental restraint systems (SRS) and replace antilock brake systems components.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

*SCOPE and SEQUENCE
Automotive Braking, Suspension, and Steering Systems
177003
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3. Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	1.2 *Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.2.1. Extract relevant, valid information from materials and cite sources of information. 1.2.2. Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 1.2.3. Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.4. Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.6. Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers 1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. 1.2.8. Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2. Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. 1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2. Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). 1.4.2. Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 1.4.3. Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 1.4.4. Use system hardware to support software applications. 1.4.5. Use information technology tools to maintain, secure, and monitor business records. 1.4.6. Use electronic database to access and create business and technical information. *(CTAG) 1.4.7. Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). 1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	**1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments.

	1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.6.1. Identify business opportunities. 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.1.1. Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG) 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8. Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS).

	2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1. Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	2.3. *Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.* *(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. 2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG)

Outcome/I Can	**2.4.** ***General Maintenance/ Provide general maintenance to mechanical systems.*** ***(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **2.4.1. Inspect for leakage at seals, gaskets, and bushings.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) In-Vehicle Transmission and Transaxle Repair: 2. Inspect for leakage; replace external seals, gaskets, and bushings. P-2 ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 5. Install engine covers using gaskets, seals, and sealers as required. P-1 **2.4.2. Inspect fluid levels and fluid conditions on all mechanical systems.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) General: Transmission and Transaxle Diagnosis: 3. Diagnose fluid loss and condition concerns; determine necessary actions. P-1 **2.4.3. Select engine, powertrain, power steering, and brake system fluids based on characteristics and applications.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering System Diagnosis and Repair: 9. Determine proper power steering fluid type; inspect fluid level and condition. P-1 **2.4.4. Describe characteristics of engine fuels and fuel additives.** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.1.** ***Hydraulic Brake Systems/ Identify, inspect and replace hydraulic components of brake systems*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis:

2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1

4.1.1. Identify pressure concerns in the brake system using hydraulic principles (Pascal's Law).

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
1. Diagnose pressure concerns in the brake system using hydraulic principals (Pascal's Law). P-1

4.1.2. Identify poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system.

ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis:
1. Identify and interpret brake system concerns; determine necessary actions. P-1
ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
5. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action. P-3

4.1.3. Measure brake pedal height and test pedal free play.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
2. Measure brake pedal height, travel, and free play (as applicable); determine necessary action. P-1

4.1.4. Check the master cylinder for internal and external leaks and proper operations.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
3. Check master cylinder for internal/external leaks and proper operation; determine necessary action. P-1
13. Test brake fluid for contamination. P-1

4.1.5. Remove, bench bleed and reinstall the master cylinder.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
4. Remove, bench bleed, and reinstall master cylinder. P-1
9. Select, handle, store, and fill brake fluids to proper level. P-1

4.1.6. Inspect brake lines for damage and wear.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
6. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, and wear; check for loose fittings and supports; determine necessary action. P-1
7. Replace brake lines, hoses, fittings, and supports. P-2

4.1.7. Fabricate and install rigid and flexible fluid lines and fittings.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
8. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types). P-2

4.1.8. Identify brake pressure valves.

ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair:
10. Inspect, test, and/or replace components of brake light warning light system. P-3
11. Identify components of a brake light warning system. P-2

4.1.9. Check power assist operations (e.g., manifold or auxiliary pump vacuum supply to a vacuum type power booster).

ASE REQUIRED TASK LIST (BRAKES) Power-Assist Units Diagnosis and Repair:
1. Check brake pedal travel with, and without, engine running to verify proper power booster operation. P-2
2. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. P-1
3. Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation; determine necessary action. P-1
ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:
1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.2. *Drum and Disc/ Identify, inspect and replace mechanical components of drum and disc brake systems.* *(CTAG) [Perform brake system inspection] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **4.2.1. Identify poor stopping, noise, vibration, premature wear, pulling, grabbing, dragging, or pedal pulsation concerns.** ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary actions. P-1 ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary actions. P-1 **4.2.2. Remove the caliper assembly; clean; inspect for leaks, pad condition and damage; and replace.** ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 2. Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action. P-1 3. Clean and inspect caliper mounting and slides/pins for proper operation and wear, and damage; determine necessary action. P-1 4. Remove, inspect, and replace pads and retaining hardware; determine necessary action. P-1 5. Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks. P-1 11. Check brake pad wear indicator; determine necessary action. P-2 12. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. P-1 **4.2.3. Remove, clean, inspect and measure drums and rotors. *(CTAG)** ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 5. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial- caliper). ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 2. Remove, clean, inspect, and measure brake drum diameter; determine necessary action. P-1 ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 6. Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral runout; determine necessary actions. P-1

	4.2.4. Refinish drums and rotors. ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 3. Refinish brake drum and measure final drum diameter; compare with specifications. P-1 ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 7. Remove and reinstall rotor. P-1 9. Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. P-1 **4.2.5. Remove, inspect and replace wheel cylinders.** ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 5. Inspect wheel cylinders for leaks and proper operation; remove and replace as needed. P-2 **4.2.6. Remove, clean, inspect and lubricate brake shoes, retaining hardware and adjustment hardware. *(CTAG)** ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 4. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. P-1 **4.2.7. Pre-adjust brake shoes, seat the pads and adjust the parking brake system. *(CTAG)** ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 6. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments. P-2 ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 3. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. P-2 **4.2.8. Lubricate drum and disc brake assembly components, reinstall and inspect for leaks.*(CTAG)** **4.2.9. Check the condition and operation of the parking brake and clean, lubricate, or replace as needed. *(CTAG)** ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 4. Check parking brake operation and parking brake indicator light system operation; determine necessary action. P-1 **4.2.10. Check the operation of parking brake indicator light and brake stop light systems.** ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 5. Check operation of brake stop light system. P-1 **4.2.11. Inspect and adjust the caliper piston on an integral parking brake system.** ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 10. Retract and re-adjust caliper piston on an integrated parking brake system. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.4. *Antilock Brakes/ Identify, inspect and replace antilock brake systems.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **4.4.1. Identify and inspect antilock brake system (ABS) components.** **4.4.2. Identify poor stopping, wheel lock-up, abnormal pedal feel or pulsation and noise concerns caused by the ABS.** ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 3. Describe procedure for performing a road test to check brake system operation; including an anti-lock brake system (ABS). P-1 **4.4.3. Identify ABS braking concerns caused by vehicle modifications (e.g., tire size, curb height, final drive ratio).** **4.4.4. Identify ABS electronic controls and components.** **4.4.5. Depressurize high-pressure components and bleed front and rear hydraulic circuits.** **4.4.6. Re-adjust the caliper piston on an integral parking brake system.** ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 10. Retract and re-adjust caliper piston on an integrated parking brake system. P-3 **4.4.7. Remove and install ABS electrical and/or electronic and hydraulic components.** **4.4.8. Interpret the output signal, resistance charts to voltage/ground and frequency data.** **4.4.9. Identify traction control and/or vehicle stability control system components.** ASE REQUIRED TASK LIST (BRAKES) Electronic Brake, Traction and Stability Control Systems Diagnosis and Repair: 2. Identify Traction control/vehicle stability control system components. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.5. *Steering/ Identify steering system components.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (SUSPENSION and STEERING) General: Suspension and Steering Systems: 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 4. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. P-2 5. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. P-2 **5.5.1. Disable and enable the supplemental restraint system (SRS).** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 1. Disable and enable supplemental restraint system (SRS). P-1 **5.5.2. Remove and replace the steering wheel and center and time the SRS coil (clock spring).** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 2. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring). P-1 **5.5.3. Inspect steering shaft universal joints and flexible couplings.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 6. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action. P-2 **5.5.4. Remove, inspect, replace and adjust the power steering pump belt, power steering pump, power steering pump pulley, hoses and fittings and check pulley and belt alignment.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 11. Inspect for power steering fluid leakage;determine necessary action. P-1 12. Remove, inspect, replace, and adjust power steering pump drive belt. P-1 13. Remove and reinstall power steering pump. P-2 14. Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment. P-2 15. Inspect and replace power steering hoses and fittings. P-2 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 3. Describe the function of the power steering switch. P-3

	5.5.5. Inspect and replace the pitman arm, relay rod (center-link/intermediate), idler arm and mountings and steering linkage damper. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 16. Inspect and replace the pitman arm, relay (center-link/intermediate) rod, idler arm and mountings, and steering linkage damper. P-2 **5.5.6. Inspect, replace and adjust tie rod ends (sockets), tie rod sleeves and clamps.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 8. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed. P-2 17. Inspect, replace, and adjust tie rods ends (sockets), tie rod sleeves, and clamps. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.6. *Suspension/Remove, inspect and install front and rear suspension.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **5.6.1. Identify short arm and long arm suspension system components.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 1. Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action. P-1 **5.6.2. Identify strut suspension system components.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 2. Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action. P-1 **5.6.3. Remove, inspect and install upper and lower control arms, bushings, shafts, upper and lower ball joints and rebound bumpers.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 3. Inspect, remove and install upper and lower control arms, bushings, shafts, and rebound bumpers. P-3 5. Inspect, remove and install upper and/or lower ball joints (with or without wear indicators). P-2 **5.6.4. Remove, inspect and install strut rods (compression and tension) and bushings.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 4. Inspect, remove and install strut rods and bushings. P-3

	5.6.5. Remove, inspect and install steering knuckle assemblies. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 6. Inspect, remove and install steering knuckle assemblies. P-3 **5.6.6. Remove, inspect and install short arm and long arm suspension system coil springs and spring insulators.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 7. Inspect, remove and install short and long arm suspension system coil springs and spring insulators. P-3 **5.6.7. Remove, inspect, install and adjust suspension system torsion bars and stabilizer bar bushings, brackets and links and inspect mounts.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 8. Inspect, remove and install torsion bars and mounts. P-3 9. Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links. P-3 **5.6.8. Remove, inspect and install a strut cartridge or assembly, strut coil spring, insulators (silencers) and upper strut bearing mount.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 10. Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. P-3 **5.6.9. Remove, inspect and install transverse links, control arms, bushings and mounts.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 11. Inspect, remove and install track bar, strut rods/radius arms, and related mounts and bushings. P-3 **5.6.10. Remove, inspect and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings and mounts.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 12. Inspect rear suspension leaf spring(s), bushings, center pins/bolts, and mounts. P-1 **5.6.11. Inspect, remove and replace shock absorbers.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 1. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.7. *Wheel Alignment/ Inspect and adjust wheel alignment.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **5.7.1. Inspect, remove and replace shock absorbers and inspect mounts and bushings.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 1. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. P-1 **5.7.2. Replace front and rear wheel bearings.** ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 2. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. P-1 6. Replace wheel bearing and race. P-2 8. Remove and reinstall sealed wheel bearing assembly. P-2 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 2. Remove, inspect, and service or replace front and rear wheel bearings. P-1 **5.7.3. Identify vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, ride height and steering return concerns.** **5.7.4. Check and adjust wheel caster, camber and toe and center the steering wheel.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 2. Perform prealignment inspection and measure vehicle ride height; perform necessary action. P-1 3. Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel. P-1 4. Check toe-out-on-turns (turning radius); determine necessary action. P-2 5. Check SAI (steering axis inclination) and included angle; determine necessary action. P-2 6. Check rear wheel thrust angle; determine necessary action. P-1 7. Check for front wheel setback; determine necessary action. P-2 8. Check front and/or rear cradle (subframe) alignment; determine necessary action. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.8. *Wheels and Tires/ Identify, inspect, and replace wheel and tire components and assemblies.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 5. Diagnose tire pull problems; determine necessary. P-2 7. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-2 8. Inspect tire and wheel assembly for air loss; perform necessary action. P-1 9. Repair tire using internal patch. P-1 **5.8.1. Identify tire wear patterns and tire construction.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 1. Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action. P-1 3. Rotate tires according to manufacturer's recommendations. P-1 **5.8.2. Identify bearing noises and wheel vibration, shimmy, and noise.** ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary actions. P-3 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 2. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action. P-2 **5.8.3. Measure wheel, tire, axle, and hub run-out.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 4. Measure wheel, tire, axle flange, and hub runout; determine necessary action. P-2 **5.8.4. Balance wheel and tire assembly.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 6. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). P-1 **5.8.5. Remove, inspect, and reinstall tire and wheel assembly and calibrate tire pressure monitoring system.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 10. Identify and test tire pressure monitoring system (indirect and direct) for operation; verify operation of instrument panel lamps. P-2 11. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. P-1

	5.8.6. Inspect and replace wheel studs. ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 4. Install wheel and torque lug nuts. P-1 ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 7. Inspect and replace wheel studs. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Drive Axles: 1. Inspect and replace drive axle wheel studs. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Ground Transportation Electrical/Electronics

177002

Students will diagnose and repair vehicle electrical systems, including chassis electrical, charging, starting and lighting systems. Students will learn the fundamentals of direct current (DC) electronics including series, parallel, and series-parallel circuits. Students will use electronic diagnostic tools, read schematics, and utilize printed and electronic repair manuals to troubleshoot electrical circuits, test components and replace defective modules.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

*SCOPE and SEQUENCE
Ground Transportation Electrical/Electronics
177002
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	1.2 *Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.2.1. Extract relevant, valid information from materials and cite sources of information. 1.2.2. Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers 1.2.3. Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.4. Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.6. Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers. 1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. 1.2.8. Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. 1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations. *(CTAG)[Demonstrate basic usage of a service manual and/or service information system] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). 1.4.2. Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 1.4.3. Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 1.4.4. Use system hardware to support software applications. 1.4.5. Use information technology tools to maintain, secure, and monitor business records. 1.4.6. Use electronic database to access and create business and technical information. *(CTAG) 1.4.7. Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). 1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.6.1. Identify business opportunities. 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.1.1. Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG)

	2.1.5. Identify the reason to use ground fault interrupter circuits (GFCIs), sources of electrical hazards, and establish shutdown and lock-out/tag-out procedures. 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8.Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.13. Identify the types of ergonomic workflow and the need for them. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	**2.3. *Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** ***(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG)** ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. **2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG)** **2.3.3. Operate power tools and stationary equipment in accordance with established procedures and safety standards. *(CTAG)**

Outcome/I Can	**2.4. *General Maintenance/ Provide general maintenance to mechanical systems.*** ***(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats, ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 4. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1 **2.4.15. Inspect and service battery and battery cables, connectors, clamps, and hold downs. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1 **2.4.16. Inspect interior and exterior lamps and sockets.** **2.4.17. Verify operation of instrument panel gauges and warning/indicator lights and reset maintenance indicators.** ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Removal and Reinstallation (R&R): 3. Verify operation of the instrument panel engine warning indicators. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.5.** ***Electrical and Electronic Systems/ Diagnose the electrical and electronic integrity of series, parallel and series-parallel circuits using principles of electricity (e.g., Ohm's Law, Watt's Law).*** ***(CTAG) [Perform starting and charging system inspection and test]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis: Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **4.5.1. Interpret wiring diagrams of electrical circuits.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 7. Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems. P-1 **4.5.2. Measure the source voltage and perform voltage drop and current draw tests in electrical and electronic circuits. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 3. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance. P-1 **4.5.3. Measure current, continuity and resistance.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (ohm's Law). P-1 **4.5.4. Identify capacitance and inductance.** **4.5.5. Inspect and test switches, connectors, relays, solenoid, solid state devices and wires of electrical and electronic circuits.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 10. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action. P-1 **4.5.6. Remove and repair or replace terminal connectors.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 11. Replace electrical connectors and terminal ends. P-1

	4.5.7. Perform solder repair of electrical wiring. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 12. Repair wiring harness. P-3 13. Perform solder repair of electrical wiring. P-1 4.5.8. Locate shorts, grounds, opens and resistance problems in electrical and electronic circuits. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 4. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-1 5. Check operation of electrical circuits with a test light. P-1 6. Check operation of electrical circuits with fused jumper wires. P-1 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 4.5.9. Measure and diagnose the causes of excessive key-off battery drain (parasitic draw). ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 8. Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action. P-1 4.5.10. Inspect, test and replace or reset fusible links, circuit breakers and fuses. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.6. *Batteries/ Diagnosis and service batteries.* *(CTAG) [Perform starting and charging system inspection and test] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 4.6.1. Identify battery construction and principles of operation. 4.6.2. Test battery performance using state-of-charge and conductance tests and record test results. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 1. Perform battery state-of-charge test; determine necessary action. P-1

	4.6.3. **Confirm proper battery capacity for vehicle application and perform a battery capacity test.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. P-1 **4.6.4.** **Maintain or restore electronic memory functions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 3. Maintain or restore electronic memory functions. P-1 8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. P-1 **4.6.5.** **Perform a battery charge. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 5. Perform slow/fast battery charge according to manufacturer's recommendations. P-1 **4.6.6.** **Start a vehicle using jumper cables and a battery or auxiliary power supply using manufacturer's jumping techniques and precautions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1 **4.6.7.** **Remove and replace a battery.** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.7.** ***Starting and Charging Systems/ Identify, inspect and replace starting and charging system components.*** ***(CTAG) [Perform starting and charging system inspection and test]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **4.7.1.** **Differentiate between electrical and engine mechanical problems that cause a slow crank or no crank condition.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Starting System Diagnosis and Repair: 1. Perform starter current draw tests; determine necessary action. P-1 2. Perform starter circuit voltage drop tests; determine necessary action. P-1 3. Inspect and test starter relays and solenoids; determine necessary action. P-2 5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. P-2 6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition. P-2 **4.7.2.** **Inspect, test and replace low and high current side components.**

	4.7.3. Perform charging system output tests to identify causes of undercharge, no charge and overcharge conditions. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 1. Perform charging system output test; determine necessary action. P-1 2. Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions. P-1 5. Perform charging circuit voltage drop tests; determine necessary action. P-1 **4.7.4. Inspect and adjust or replace alternator drive belts, pulleys and tensioners and check pulley and belt alignment. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 3. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. P-1 **4.7.5. Remove, inspect and install an alternator and starter.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Starting System Diagnosis and Repair: 4. Remove and install a starter in a vehicle. P-1 ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 4. Remove, inspect, and re-install generator (alternator). P-1 **4.7.6. Identify the high voltage circuit of electric or hybrid electric vehicles and related safety precautions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. P-3 ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 14. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits, voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.8. *Lighting and Accessories/ Identify, inspect, and replace electrical and electronic components of lighting systems and accessories.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5)

4.8.1. Identify the cause of brighter than normal, intermittent, dim, or no light operation.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Lighting System Diagnosis and Repair:

1. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action. P-1

2. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1

4.8.2. Inspect, replace and aim headlights and bulbs.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Lighting System Diagnosis and Repair:

3. Aim headlights. P-2

4.8.3. Identify and inspect incorrect turn signal or hazard light operation.

4.8.4. Identify and inspect brake light circuit switches, wiring and connectors.

4.8.5. Identify system voltage and safety precautions associated with (HID) high-intensity discharge headlights.

4.8.6. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair:

1. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action. P-2

2. Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action. P-2

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

9. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P-1

4.8.7. Identify incorrect horn operation.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair:

1. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action. P-1

4.8.8. Identify incorrect wiper and washer operation and replace.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair:

2. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2

3. Diagnose (troubleshoot) windshield washer problems; perform necessary action. P-2

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

10. Verify windshield wiper and washer operation, replace wiper blades. P-1

4.8.9. Identify incorrect operation of motor-driven accessories.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

1. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action. P-2

4.8.10. Identify incorrect heated glass, mirror, or seat operation and repair.

4.8.11. Identify incorrect electric lock operation and repair.

	4.8.12. Identify airbag supplemental restraint system (SRS) concerns. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 14. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits, voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONICS) Accessories Diagnosis and Repair: 4. Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action. P-2 **4.8.13. Identify safety concerns for disarming and enabling the airbag system for vehicle service.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair: 5. Disable and enable an airbag system for vehicle service; verify indicator lamp operation. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Ground Transportation Engine and Power Train

177001

Students will inspect, adjust and repair internal combustion engines and drivetrain. Topics include physical and mechanical principles of engines, transmissions and transaxles, differentials and cooling systems. Students will learn precision measurement, inspection, and reconditioning techniques. Students will also identify customer's needs, determine labor rates, and create estimates.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

SCOPE and SEQUENCE
Ground Transportation Engine and Power Train
177001
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	**1.2** ***Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.2.1.** Extract relevant, valid information from materials and cite sources of information. **1.2.2.** Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers **1.2.3.** Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.4.** Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.2.5.** Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.6.** Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers. **1.2.7.** Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. **1.2.8.** Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. **1.2.9.** Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.4.1.** Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). **1.4.2.** Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. **1.4.3.** Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.4.4.** Use system hardware to support software applications. **1.4.5.** Use information technology tools to maintain, secure, and monitor business records. **1.4.6.** Use electronic database to access and create business and technical information. *(CTAG) **1.4.7.** Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). **1.4.8.** Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	**1.5.** ***Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.5.3.** Use cultural intelligence to interact with individuals from diverse cultural settings. **1.5.4.** Recognize barriers in cross-cultural relationships and implement behavioral adjustments. **1.5.5.** Recognize the ways in which bias and discrimination may influence productivity and profitability. **1.5.7.** Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	**1.6.** ***Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.6.1.** Identify business opportunities. **1.6.5.** Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. **1.6.8.** Identify the features and benefits that make an organization's product or service competitive. **1.6.9.** Explain how the performance of an employee, a department, and an organization is assessed. **1.6.12.** Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	**2.1.** ***Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.*** ***(CTAG) [Demonstrate the ability to work safely in the automotive shop environment]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**2.1.1.** Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. **2.1.2.** Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG)

	2.1.5. Identify the reason to use ground fault interrupter circuits (GFCIs), sources of electrical hazards and established shutdown and lock-out/tag-out procedures. *(CTAG) 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.8. Identify procedures for handling, storage and disposal of hazardous materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8.Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.10. Describe the interactions of incompatible substances in measuring and mixing chemicals.*(CTAG) 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.13. Identify the types of ergonomic workflow and the need for them. *(CTAG) 2.1.14. Inspect air and exhaust systems, intake filters, fans and other mechanical components. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.4. Identify workplace risk factors associated with repetitive motion and lifting, operating and moving heavy objects. *(CTAG)

	2.2.5. Demonstrate appropriate body mechanics in lifting and moving heavy objects. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	2.3. ***Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** ***(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. 2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG) 2.3.3. Operate power tools and stationary equipment in accordance with established procedures and safety standards. *(CTAG) 2.3.5. Clean, lubricate and adjust power tools and stationary equipment. *(CTAG) 2.3.6. Identify, select and maintain fluids and filters. *(CTAG) ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 3. Replace fuel filter(s). P-1 ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis: 10. Perform engine and oil filter change. P-1

Outcome/I Can	**3.1.** ***Engine Cylinder Head and Block Assemblies/ Remove, disassemble and repair components in engine cylinder head and block assemblies*** ***(CTAG) [Perform a cooling system basic inspection, flush and fill on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 2. Reasearch applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins. P-1 6. Remove and replace timing belt; verify correct camshaft timing. P-1 7. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. P-1 ASE REQUIRED TASK LIST (ENGINE REPAIR) Cylinder Head and Valve Train Diagnosis and Repair: 1. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures. P-1 2. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition. P-1 3. Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action. P-2 4. Adjust valves (mechanical or hydraulic lifters). P-1 5. Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing. P-1 6. Establish camshaft position sensor indexing. P-1 **3.1.1. Describe the physical and mechanical principles of engine operation (i.e., motion, friction, thermodynamics).** **3.1.2. Calculate displacement and compare and contrast displacement, horsepower and torque.** **3.1.3. Compare and contrast two-cycle and four-cycle engines and their operating principles.** **3.1.4. Describe the features, benefits and application of engine types.** **3.1.5. Inspect an engine assembly for fuel, oil, coolant and other leaks and determine potential causes. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Removal and Reinstallation (R & R): 4. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. P-1

3.1.6. Diagnose engine noises and vibrations.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

3. Diagnose abnormal engine noises or vibration concerns; determine necessary action. P-2

9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2

11. Verify correct camshaft timing. P-1

ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R):

8. Inspect, remove and replace engine mounts. P-2

ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Block Assembly Diagnosis and Repair:

1. Remove, inspect, or replace crankshaft vibration damper (harmonic balancer). P-2

ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:

9. Perform oil pressure tests; determine necessary action. P-1

3.1.7. Verify the engine operating temperature.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

10. Verify engine operating temperature; determine necessary action. P-1

ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:

2. Identify causes of engine overheating. P-1

12. Inspect, test, and replace oil temperature and pressure switches and sensors. P-2

3.1.8. Diagnose causes of excessive oil consumption and unusual exhaust color and sound.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

4. Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine neceessasry action. P-2

3.1.9. Perform engine tests for vacuum, power balance, compression and leakage.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

5. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. P-1

6. Perform cylinder power balance test; determine necessary action. P-2

7. Perform cylinder cranking and running compression tests; determine necessary action. P-1

8. Perform cylinder leakage test; determine necessary action. P-1

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**3.5. *Lubrication and Cooling Systems/ Inspect lubrication and cooling systems operation.*** ***(CTAG) [Perform a cooling system basic inspection, flush and fill on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **3.5.1. Explain principles of engine lubrication and cooling.** **3.5.2. Perform lubrication, cooling system and pressure and sensor tests.** **3.5.3. Inspect the oil pump gears or rotors, housing, pressure relief devices and pump drive.** **3.5.4. Inspect, test and replace the radiator, pressure cap, coolant recovery tank and hoses. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 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, and heater core and gallery plugs; determine necessary action. P-1 **3.5.5. Inspect and replace engine cooling and heater system hoses. *(CTAG)** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair: 1. Inspect engine cooling and heater systems hoses; perform necessary action. P-1 2. Inspect and test heater control valve(s); perform necessary action. P-2 **3.5.6. Inspect, test and replace the thermostat and gasket. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 7. Remove, inspect, replace thermostat and gasket/seal. P-1 **3.5.7. Test, drain, flush and refill coolant and bleed the cooling system. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 6. Remove and replace radiator. P-2 **3.5.8. Inspect, remove and replace the water pump. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling Systems Diagnosis and Repair: 5. Inspect, remove, and replace water pump. P-2 **3.5.9. Inspect and test mechanical and electrical fans, fan clutches, fan shrouds and air dams. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 8. Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.1.** ***Automatic Transmission and Transaxle Performance/ Identify, inspect, adjust, and replace automatic transmissions and transaxles.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 1. Indentify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action. P-1 ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) In-Vehicle Transmission/Transaxle Maintenance and Repair: 1. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. P-2 3. Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harness. P-1 **5.1.1. Research applicable vehicle and service information (e.g., transmission and transaxle system operation, fluid type, vehicle service history, service precautions, technical service bulletins).** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 2. Research applicable vehicle and service information fluid type, vehicle service history, service precautions, and technical service bulletins. P-1 **5.1.2. Locate and interpret vehicle and major component identification numbers (i.e., vehicle identification number [VIN], vehicle certification labels, calibration decals).** **5.1.3. Investigate fluid loss and condition concerns.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis: 4. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1 **5.1.4. Inspect powertrain mounts.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) In-Vehicle Transmission/Transaxle Maintenance and Repair: 5. Inspect, replace and align power train mounts. P-2 **5.1.5. Remove and reinstall the transmission, transaxle and torque converter.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) Off-Vehicle Transmission/Transaxle Repair: 1.Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces. P-1

	5.1.6. Inspect for leaks on cooler lines and fittings. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) Off-Vehicle Transmission/Transaxle Repair: 2.Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.2. *Manual Transmission and Transaxle/ Diagnose and repair manual transmissions and transaxles.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) General: Drive Train Diagnosis: 1. Identify and interpret drive train concerns; determine necessary action. P-1 2. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. P-1 3. Check fluid condition; check for leaks; determine necessary action. P-1 4. Drain and refill manual transmission/transaxle and final drive unit. P-1 5.2.1. Identify the major components of manual transmissions, their function and the overall operation of manual transmissions. 5.2.2. Inspect, test and replace transmission and transaxle sensors and switches. ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.3. *Clutches/ Identify and inspect clutches.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 5.3.1. Identify clutch noise, binding, slippage, pulsation and chatter. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 1. Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action. P-1

	5.3.2. Inspect the clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 2. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Transmission/Transaxle Diagnosis and Repair: 1. Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers. P-2 5.3.3. Inspect the hydraulic clutch slave and master cylinders, lines and hoses. 5.3.4. Inspect and replace the clutch pressure plate assembly and clutch disc. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 3. Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable). P-1 5.3.5. Bleed the clutch hydraulic system. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 4. Bleed clutch hydraulic system. P-1 5.3.6. Inspect and measure the flywheel run-out, crankshaft endplay and ring gear for wear and cracks. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 6. Inspect flywheel and ring gear for wear and cracks; determine necessary action. P-1 5.3.7. Check and adjust the clutch master cylinder levels and check for leaks. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 5. Check and adjust clutch master cylinder fluid level; check for leaks. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.4. ***Drive Axle Universal and Differentials/ Identify, inspect, and replace drive axle differential components.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Four Wheel Drive/All Wheel Drive Component Diagnosis and Repair: 1. Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets. P-3 2. Inspect front-wheel bearings and locking hubs; perform necessary action(s). P-3 3. Check for leaks at drive assembly seals; check vents; check lube level. P-3 4. Identify concerns related to variations in tire circumference and/or final drive ratios. P-3

	5.4.1. Identify and inspect drive axle and differential assemblies for noise, vibration and fluid leakage concerns. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 1. Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action. P-1 2. Diagnose universal joint noise and vibration concerns; perform necessary action. P-2 **5.4.2. Service and replace the shaft, yokes, boots and joints.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 4. Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. P-1 **5.4.3. Replace drive axle seals, bearings and retainers.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 3. Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Drive Axles: 2. Remove and replace drive axle shafts. P-1 3. Inspect and replace drive axle shaft seals, bearings, and retainers. P-2 **5.4.4. Inspect, adjust and replace drive belts and chains.** **5.4.5. Inspect and replace drive axle housing cover plates, gaskets, sealants, vents, plugs and seals.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Ring and Pinion Gears and Differential Case Assembly: 1. Clean and inspect differential housing; check for leaks; inspect housing vent. P-2 2. Check and adjust differential housing fluid level. P-1 3. Drain and refill differential housing. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Ground Transportation HVAC

177004

Students will learn principles of heating, ventilation and air conditioning systems (HVAC) for use in motor vehicles. They will also inspect, diagnose, repair and maintain vehicle air conditioning and heating systems. Students will use service equipment to evacuate, store and charge the air conditioning system. An emphasis will be given to the safe handling of refrigerants following EPA regulations.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

SCOPE and SEQUENCE
Ground Transportation HVAC
177004
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	**1.2** ***Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.2.1.** Extract relevant, valid information from materials and cite sources of information. **1.2.2.** Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. **1.2.3.** Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.4.** Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.2.5.** Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.6.** Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers. **1.2.7.** Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. **1.2.8.** Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. **1.2.9.** Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.4.1.** Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). **1.4.2.** Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. **1.4.3.** Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.4.4.** Use system hardware to support software applications. **1.4.5.** Use information technology tools to maintain, secure, and monitor business records. **1.4.6.** Use electronic database to access and create business and technical information. *(CTAG) **1.4.7.** Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). **1.4.8.** Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.6.1. Identify business opportunities. 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.1.1. Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG)

	2.1.5. Identify the reason to use ground fault interrupter circuits (GFCIs), sources of electrical hazards and established shutdown and lock-out/tag-out procedures. *(CTAG) 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.7. Identify symptoms of exposure to health-threatening environments (e.g., temperature; chemical; biological; noise, vibrations, harshness [NVH] hazards).*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 5. Utilize proper ventilation procedures for working within the lab/shop area. 2.1.8. Identify procedures for handling, storage and disposal of hazardous materials.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8.Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.10. Describe the interactions of incompatible substances in measuring and mixing chemicals.*(CTAG) 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.13. Identify the types of ergonomic workflow and the need for them. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions.

	2.2.4. Identify workplace risk factors associated with repetitive motion and lifting, operating and moving heavy objects. *(CTAG) 2.2.5. Demonstrate appropriate body mechanics in lifting and moving heavy objects. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	2.3. ***Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** *(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. 2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG) 2.3.3. Operate power tools and stationary equipment in accordance with established procedures and safety standards. *(CTAG) 2.3.6. Identify, select, and maintain fluids and filters. *(CTAG) 2.3.7. Inspect and maintain fluid conveyance and storage components (e.g., hoses and lines, valves, nozzles). *(CTAG) 2.3.8. Identify the requirements for calibrating metering, monitoring and sensing equipment. *(CTAG)

Outcome/I Can	**2.4.** ***General Maintenance/ Provide general maintenance to mechanical systems.*** ***(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **2.4.1. Inspect for leakage at seals, gaskets, and bushings.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) In-Vehicle Transmission and Transaxle Repair: 2. Inspect for leakage; replace external seals, gaskets, and bushings. P-2 ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R) 5. Install engine covers using gaskets, seals, and sealers as required. P-1 **2.4.12. Store mechanical systems fluids and waste products.** **2.4.13. Inspect and replace drive belts.** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 3. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1 **2.4.14. Identify the sources of air conditioner (A/C) system odors.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Operating Systems and Related Controls Diagnosis and Repair: 7. Inspect the source of A/C sustem odors. P-2 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.9. *Heating, Ventilation and Air Conditioning Systems/ Diagnose and repair heating, ventilation and air conditioning (HVAC) system components and controls.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R) 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 1. Identify and interpret heating and air conditioning problems; determine necessary action. P-1 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 3. Performance test A/C system; identify problems. P-1 4. Identify abnormal operating noises in the A/C system; determine necessary action. P-2 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 10. Inspect evaporator housing water drain; perform necessary action. P-1 11. Determine procedure to remove and reinstall evaporator; determine required oil quantity. P-2 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Operating Systems and Related Controls Diagnosis and Repair: 1. Inspect and test A/C –heater blower motors, resistors, switches, relays, wiring, and protection devices; perform necessary action. P-1 2. Diagnose A/C compressor clutch control system; determine necessary action. P-2 3. Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action. P-2 5. Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action. P-3 6. Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. P-1 8. Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; Determine necessary action. P-2 **4.9.1. Identify the major components of the HVAC system, their functions and the overall operation of the system.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 1. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. P-1 3. Remove, inspect, and install A/C compressor and mountings; determine recommended oil quanity. P-2 7. Inspect A/C condenser for airflow restrictions; perform necessary action. P-1 8. Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine recommended oil quantity. P-2

	4.9.2. Perform pressure and leak testing. ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 5. Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings. P-1 6. Leak test A/C system; determine necessary action. P-1 **4.9.3. Identify air conditioning (A/C) system mufflers, hoses, lines, fittings, O-rings, seals, condenser and service valves.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 6. Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action. P-2 9. Remove, inspect, and install expansion valve or orifice (expansion) tube. P-1 **4.9.4. Handle, identify, recover and store recycled refrigerant.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigerant Recovery, recycling, and Handling: 1. Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards. P-1 3. Recycle, label, and store refrigerant. P-1 **4.9.5. Evacuate and charge the A/C system.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 7. Inspect condition of refrigerant oil removed from A/C system; determine necessary action. P-2 8. Determine recommended oil and oil capacity for system application. P-1 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigerant Recovery, recycling, and Handling: 4. Evacuate and Charge A/C system; add refrigerant oil as required. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Automotive Engine Performance

177006

Students will research vehicle service histories using model specific service bulletins. Students will test and diagnose for engine performance in fuel, air induction and exhaust systems using advanced testing procedures. Topics include computerized engine controls including retrieving and recording diagnostic trouble codes using On Board Diagnostics (OBD). Additionally, students will diagnose drivability and emissions problems resulting from malfunctions of interrelated systems.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

SCOPE and SEQUENCE
Automotive Engine Performance
177006
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	1.2 *Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.2.1. Extract relevant, valid information from materials and cite sources of information. 1.2.2. Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 1.2.3. Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.4. Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. 1.2.6. Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers 1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. 1.2.8. Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. 1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.4.1.** Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). **1.4.2.** Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. **1.4.3.** Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.4.4.** Use system hardware to support software applications. **1.4.5.** Use information technology tools to maintain, secure, and monitor business records. **1.4.6.** Use electronic database to access and create business and technical information. *(CTAG) **1.4.7.** Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). **1.4.8.** Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.6.1. Identify business opportunities. 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.1.1. Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG)

	2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8.Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.13. Identify the types of ergonomic workflow and the need for them. *(CTAG) 2.1.14. Inspect air and exhaust systems, intake filters, fans and other mechanical components. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	**2.3.** ***Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** ***(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry]**
Competencies	**2.3.8.** Identify the requirements for calibrating metering, monitoring and sensing equipment. *(CTAG)

Outcome/I Can	**2.4.** ***General Maintenance/ Provide general maintenance to mechanical systems.*** ***(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **2.4.6. Replace fuel filters.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 3. Replace fuel filter(s). P-1 **2.4.8. Inspect, service, or replace air filters, filter housings, and intake ductwork.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 4. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.2. *Computerized Engine Controls/ Perform diagnosis and repair of computerized engine controls.* *(CTAG) [Access onboard diagnostic system codes] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **3.2.1. Retrieve and record stored on-board diagnostics (OBD) trouble codes and clear codes where applicable. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. P-1 **3.2.2. Follow published diagnostic procedures and steps to identify the causes of emissions or drivability concerns resulting from malfunctions in the computerized engine control system with stored diagnostic trouble codes.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 2. Access and use service information to perform step-by-step (troubleshooting) diagnosis. P-1 4. Describe the importance of running all OBDII monitors for repair verification. P-1 **3.2.3. Check for module communication errors (e.g., controller area network [CAN], BUS systems).** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Accessories Diagnosis and Repair: 7. Check for module communication errors (including CAN/BUS systems) using a scan tool. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 **3.2.4. Inspect and test computerized engine control system sensors, powertrain control modules (PCMs), actuators and circuits.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 3. Perform active tests of actuators using a scan tool; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1

	3.2.5. Diagnose drivability and emissions problems resulting from malfunctions of interrelated systems (e.g., cruise control, security alarms, suspension controls, traction controls, air conditioning, automatic transmissions, non-original equipment manufacturer [OEM]-installed accessories). ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).
Outcome/I Can	3.3. *Ignition System/ Perform ignition system diagnosis and repair.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 3.3.1. Explain basic ignition system theory. 3.3.2. Diagnose and repair ignition system problems (i.e., no starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, power loss, emissions concerns) on vehicles with electronic and distributor ignition systems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 4. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1 3.3.3. Identify causes of cranks but fails to start, hard starting and starts but does not continue to run problems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1 3.3.4. Identify causes of surging, rough operation, misfiring, low power, slow deceleration, slow acceleration and shutdown problems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 1. Identify and interpret engine performance concerns; determine necessary action. P-1 3.3.5. Inspect and test ignition primary and secondary circuit wiring and solid state components. 3.3.6. Check and adjust ignition system timing and timing advance and retard. 3.3.7. Inspect and test ignition system pickup sensor or triggering devices. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.4. *Fuel, Air Induction and Exhaust System/ Perform fuel, air induction and exhaust system diagnosis and repair.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **3.4.1. Explain principles of exhaust, intake and turbocharger design and operations.** **3.4.2. Identify conditions of hot or cold no starting, hard starting, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling and emissions problems.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 1. Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor milage, and emissions concerns; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair: 8. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emission control systems; determine necessary action. P-3 **3.4.3. Check fuel for contaminants and quality.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 **3.4.4. Inspect and test fuel pumps and pump control systems for pressure, regulation and volume.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 2. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action. P-1 **3.4.5. Inspect and test the cold enrichment system and components.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 7. Verify idle control operation. P-1 **3.4.6. Inspect the throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 5. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air. P-2 **3.4.7. Inspect and service governor systems.** **3.4.8. Explain fuel injection theory.** **3.4.9. Inspect and test fuel injectors.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 6. Inspect and test fuel injectors. P-2

3.4.10. Inspect the integrity of the exhaust manifold, exhaust pipes, mufflers, catalytic converters, resonators, tail pipes and heat shields.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

8. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action. P-1

9. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. P-1

3.4.11. Perform an exhaust system backpressure test.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

10. Perform exhaust system back-pressure test; determine necessary action. P-2

3.4.12. Evaluate and repair exhaust gas recirculation and exhaust gas treatment systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

3. Diagnose emissions, and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action. P-3

4. Inspect, test, service, and replace components of the EGR system including tubing, exhaust passages, vacuum/pressure controls, filters, and hoses; perform necessary action. P-2

3.4.13. Identify positive crankcase ventilation systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

1. Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action. P-3

2. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. P-2

3.4.14. Identify the parts and functions of evaporative emissions controls systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

7. Inspect and test components and hoses of the evaporative emissions control system; perform necessary action. P-1

3.4.15. Check and refill the diesel exhaust fluid (DEF) and service diesel particulate filter (DPF).

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

11. Check and refill diesel exhaust fluid (DEF). P-2

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

SCOPE and SEQUENCE

for

Transportation Capstone

177023

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in Transportation program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school and through community partnerships, students may combine classroom learning with work experience. This course can be delivered through a variety of delivery methods including cooperative education or apprenticeship.

***NATEF (AST) standards and competencies have been added and incorporated to Career-Field Pathway Standards as required for an ASE certified program**

SCOPE and SEQUENCE
Transportation Capstone
177023
West Shore Career Technical District

Outcome/I Can	**1.1.** ***Employability Skills/ Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.*** *** (CTAG) [Students will list common careers and identify the skills necessary to work in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.1.1** Identify the knowledge, skills, and abilities necessary to succeed in careers. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 10. Organizes and implements a productive plan of work. **1.1.2.** Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience. *(CTAG) **1.1.3.** Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options. **1.1.4.** Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships. **1.1.5.** Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, résumé writing, interviewing skills, portfolio development). **1.1.6.** Explain the importance of work ethic, accountability, and responsibility and demonstrate associated behaviors in fulfilling personal, community, and workplace roles.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. **1.1.7.** Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 4. Review vehicle service history. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 4. Negotiates solutions to interpersonal and workplace conflicts. 10. Organizes and implements a productive plan of work. **1.1.8.** Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism. **1.1.9.** Give and receive constructive feedback to improve work habits. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.1.10.** Adapt personal coping skills to adjust to taxing workplace demands. ASE REQUIRED SUPPLEMENTAL TASK--PREPARING VEHICLE FOR SERVICE: 3. Demonstrate the use of the three C's (concern, cause, and correction).

	1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them. 1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits, and abusive behavior. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 3.Maintains appropriate personal hygiene. ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

Outcome/I Can	**1.2.** ***Leadership and Communications/ Process, maintain, evaluate, and disseminate information in a business. Develop leadership and team building to promote collaboration.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	**1.2.1.** Extract relevant, valid information from materials and cite sources of information. **1.2.2.** Deliver formal and informal presentations. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers **1.2.3.** Identify and use verbal, nonverbal, and active listening skills to communicate effectively. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.4.** Use negotiation and conflict-resolution skills to reach solutions. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 9. Analyzes and resolves problems that arise in completing assigned tasks. **1.2.5.** Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 3. Works well with all customers and coworkers. **1.2.6.** Use proper grammar and expression in all aspects of communication. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 7. Communicates (written and verbal) effectively with customers and coworkers. **1.2.7.** Use problem-solving and consensus-building techniques to draw conclusions and determine next steps. **1.2.8.** Identify the strengths, weaknesses, and characteristics of leadership styles that influence internal and external workplace relationships. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 3. Works well with all customers and coworkers. **1.2.9.** Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

	1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 2.Contributes to the success of a team, assists others and requests help when needed. 4. Negotiates solutions to interpersonal and workplace conflicts. 1.2.11. Write professional correspondence, documents, job applications, and résumés. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 5. Contributes ideas and initiatives. 7. Communicates (written and verbal) effectively with customers and coworkers. 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.12. Use technical writing skills to complete forms and create reports. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 8. Reads and interprets workplace documents; writes clearly and concisely. 1.2.13. Identify stakeholders and solicit their opinions. 1.2.14. Use motivational strategies to accomplish goals.

Outcome/I Can	1.3 *Business Ethics and Law/ Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.3.1. Analyze how regulatory compliance affects business operations and organizational performance. 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follow directions. 1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice). ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 5. Demonstrates honesty, integrity, and reliability. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 12. Identifies and addresses the needs of all customers, providing helpful, courteous and knowledgeable service as needed. 1.3.4. Identify how federal and state consumer protection laws affect products and services. 1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], U.S. Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door-to-door sales, deceptive service estimates, fraudulent misrepresentations) and their overall impact on organizational performance.

	1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission). 1.3.8. Verify compliance with computer, copyright, and intellectual property laws and regulations. 1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational, and professional ethical standards.

Outcome/I Can	**1.4. Knowledge Management and Information Technology/ Demonstrate current and emerging strategies and technologies used to collect, analyze, record, and share information in business operations.** ***(CTAG)[Demonstrate basic usage of a service manual and/or service information system]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED***
Competencies	1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems). 1.4.2. Select and use software applications to locate, record, analyze, and present information (e.g., word processing, electronic mail, spreadsheet, databases, presentation, Internet search engines). ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 1.4.3. Verify compliance with security rules, regulations, and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to industry pathway. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 1.4.4. Use system hardware to support software applications. 1.4.5. Use information technology tools to maintain, secure, and monitor business records. 1.4.6. Use electronic database to access and create business and technical information. *(CTAG) 1.4.7. Use personal information management and productivity applications to optimize assigned tasks (e.g., lists, calendars, address books). 1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

Outcome/I Can	1.5. *Global Environment/ Evaluate how beliefs, values, attitudes, and behaviors influence organizational strategies and goals.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.5.1. Describe how cultural understanding, cultural intelligence skills, and continual awareness are interdependent. 1.5.2. Describe how cultural intelligence skills influence the overall success and survival of an organization. 1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings. 1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments. 1.5.5. Recognize the ways in which bias and discrimination may influence productivity and profitability. 1.5.6. Analyze work tasks for understanding and interpretation from a different cultural perspective. 1.5.7. Use intercultural communication skills to exchange ideas and create meaning. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed. 1.5.8. Identify how multicultural teaming and globalization can foster development of new and improved products and services and recognition of new opportunities. ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Contributes to the success of a team, assists others and requests help when needed.

Outcome/I Can	1.6. *Business Literacy/ Develop foundational skills and knowledge in entrepreneurship, financial literacy, and business operations.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.6.1. Identify business opportunities. 1.6.2. Assess the reality of becoming an entrepreneur, including advantages and disadvantages (e.g., risk vs. reward, reasons for success and failure). 1.6.3. Explain the importance of planning your business. 1.6.4. Identify types of businesses, ownership, and entities (i.e., individual proprietorships, partnerships, corporations, cooperatives, public, private, profit, not-for-profit). 1.6.5. Describe organizational structure, chain of command, the roles and responsibilities of the organizational departments, and interdepartmental interactions. 1.6.6. Identify the target market served by the organization, the niche that the organization fills, and outlook of the industry. 1.6.7. Identify the effect of supply and demand on products and services. 1.6.8. Identify the features and benefits that make an organization's product or service competitive. 1.6.9. Explain how the performance of an employee, a department, and an organization is assessed. 1.6.10. Describe the impact of globalization on an enterprise or organization.

	1.6.11. Describe how all business activities of an organization work within the parameters of a budget. 1.6.12. Describe classifications of employee benefits, rights, deductions, and compensations.

Outcome/I Can	1.9. *Financial Management/ Use financial tools, strategies, and systems to develop, monitor, and control the use of financial resources to ensure personal and business financial well-being.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	1.9.1. Create, analyze, and interpret financial documents (e.g., budgets, income statements). 1.9.2. Identify tax obligations 1.9.3. Review and summarize savings, investment strategies, and purchasing options (e.g., cash, lease, finance, stocks, bonds). 1.9.4. Identify credit types and their uses in order to establish credit. 1.9.5. Identify ways to avoid or correct debt problems. 1.9.6. Explain how credit ratings and the criteria lenders use to evaluate repayment capacity affect access to loans. 1.9.7. Review and summarize categories (types) of insurance and identify how insurances can reduce financial risk. 1.9.8. Identify income sources and expenditures. 1.9.9. Compare and contrast different banking services available through financial institutions. 1.9.10. Identify the role of depreciation in tax planning and liability.

Outcome/I Can	2.1. *Facility Safety/ Handle materials, prevent accidents, and mitigate hazards.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.1.1. Use Occupational Safety and Health Administration (OSHA)-defined procedures for identifying employer and employee responsibilities, situations that require working in confined spaces and safety labeling. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 6. Follows directions. ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 6. Identify marked safety areas. 2.1.2. Identify and communicate hazards associated with slippery surfaces and lighting. *(CTAG) 2.1.3. Apply inspection, rejection criteria and load-handling practices used with slings and spreaders. 2.1.4. Use American National Standards Institute (ANSI) hand signals and symbols.

	2.1.5. Identify the reason to use ground fault interrupter circuits (GFCIs), sources of electrical hazards and established shutdown and lock-out/tag-out procedures. *(CTAG) 2.1.6. Identify and eliminate workplace clutter and maintain clearance and boundaries. *(CTAG) 2.1.7. Identify symptoms of exposure to health-threatening environments (e.g., temperature; chemical; biological; noise, vibrations, harshness [NVH]hazards).*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 5. Utilize proper ventilation procedures for working within the lab/shop area. 2.1.8. Identify procedures for handling, storage and disposal of hazardous materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.1.9. Identify the locations of emergency flush showers, eyewash fountains, Material Safety Data Sheets (MSDSs), fire alarms and exits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 8.Identify the location of eye wash stations. 9. Identify the location of posted evacuation routes. 15. Locate and demonstrate knowledge of material safety data sheets (MSDS). 2.1.10. Describe the interactions of incompatible substances in measuring and mixing chemicals.*(CTAG) 2.1.11. Select and operate fire extinguishers based on the class of fire. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 7. 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. 2.1.12. Conduct safety inspection of a workspace. *(CTAG) 2.1.13. Identify the types of ergonomic workflow and the need for them. *(CTAG) 2.1.14. Inspect air and exhaust systems, intake filters, fans and other mechanical components. *(CTAG)

Outcome/I Can	2.2. *Personal Safety/ Practice personal safety.* *(CTAG) [Demonstrate the ability to work safely in the automotive shop environment] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*
Competencies	2.2.1. Interpret personal safety rights according to the employee Right-to-Know plan. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 1.Complies with workplace policies/laws. 2.2.2. Describe the risk factors associated with working under the influence of drugs and alcohol and how it increases the risk of accident, lowers productivity, raises insurance costs and reduces profits. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—PERSONAL STANDARDS: 4. Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.

	2.2.3. Select, use, maintain and dispose of Personal Protective Equipment (PPE) appropriate to job tasks, conditions and materials. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 6. Follow directions. 2.2.4. Identify workplace risk factors associated with repetitive motion and lifting, operating and moving heavy objects. *(CTAG) 2.2.5. Demonstrate appropriate body mechanics in lifting and moving heavy objects. *(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—WORK HABITS/ETHIC: 11. Uses scientific, technical, engineering and mathematics principles and reasoning accomplish assigned tasks. 2.2.6. Identify the steps in providing first aid and cardiopulmonary resuscitation (CPR).

Outcome/I Can	2.3. ***Tool and Equipment Preventive Maintenance/ Identify, use, clean, maintain, and perform planned preventive maintenance on tools and equipment.*** ***(CTAG) [Identify and demonstrate proper use of hand tools and equipment commonly used in the automotive service and repair industry]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	2.3.1. Identify the types of hand tools, power tools and stationary equipment and describe their function.*(CTAG) ASE REQUIRED SUPPLEMENTAL TASK—TOOLS and EQUIPMENT: 1. Identify tools and their usage in automotive applications. 2.3.2. Identify potential hazards and limitations related to the use of hand tools, power tools and stationary equipment. *(CTAG) 2.3.3. Operate power tools and stationary equipment in accordance with established procedures and safety standards. *(CTAG) 2.3.4. Ensure the presence and functionality of safety systems and hardware. *(CTAG) 2.3.5. Clean, lubricate and adjust power tools and stationary equipment. *(CTAG) 2.3.6. Identify, select and maintain fluids and filters. *(CTAG) ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 3. Replace fuel filter(s). P-1 ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis: 10. Perform engine and oil filter change. P-1 2.3.7. Inspect and maintain fluid conveyance and storage components (e.g., hoses and lines, valves, nozzles). *(CTAG) 2.3.8. Identify the requirements for calibrating metering, monitoring and sensing equipment. *(CTAG)

Outcome/I Can	2.4. *General Maintenance/ Provide general maintenance to mechanical systems.* *(CTAG) [Perform an oil change, transmission and transaxle maintenance, tire and wheel service, starting and charging system inspection/tests on a vehicle] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **2.4.1. Inspect for leakage at seals, gaskets, and bushings.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) In-Vehicle Transmission and Transaxle Repair: 2. Inspect for leakage; replace external seals, gaskets, and bushings. P-2 ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 5. Install engine covers using gaskets, seals, and sealers as required. P-1 **2.4.2. Inspect fluid levels and fluid conditions on all mechanical systems.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) General: Transmission and Transaxle Diagnosis: 3. Diagnose fluid loss and condition concerns; determine necessary actions. P-1 **2.4.3. Select engine, powertrain, power steering, and brake system fluids based on characteristics and applications.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering System Diagnosis and Repair: 9. Determine proper power steering fluid type; inspect fluid level and condition. P-1 **2.4.4. Describe characteristics of engine fuels and fuel additives.** **2.4.5. Perform engine oil and filter change.*(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis: 10. Perform engine and oil filter change. P-1 **2.4.6. Replace fuel filters.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 3. Replace fuel filter(s). P-1 **2.4.7. Flush and fill engine cooling system.** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. P-1 **2.4.8. Inspect, service, or replace air filters, filter housings, and intake ductwork.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 4. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1

	2.4.9. Drain and replace drivetrain fluids and filters. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION and TRANSAXLE) In-Vehicle Transmission and Transaxle Repair: 4. Drain and replace fluid and filter(s). P-1 **2.4.10. Flush, fill, and bleed power steering system and replace filters. *(CTAG)** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering System Diagnosis andRepair: 10. Flush, fill, and bleed power steering system. P-2 **2.4.11. Flush, fill, and bleed brake system.** ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 12. Bleed and/or flush brake system. P-1 **2.4.12. Store mechanical systems fluids and waste products.** **2.4.13. Inspect and replace drive belts.** ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 3. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1 **2.4.14. Identify the sources of air conditioner (A/C) system odors.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Operating Systems and Related Controls Diagnosis and Repair: 7. Inspect the source of A/C sustem odors. P-2 **2.4.15. Inspect and service battery and battery cables, connectors, clamps, and hold downs. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1 **2.4.16. Inspect interior and exterior lamps and sockets.** **2.4.17. Verify operation of instrument panel gauges and warning/indicator lights and reset maintenance indicators.** ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Removal and Reinstallation (R&R) 3. Verify operation of the instrument panel engine warning indicators. P-1 **2.4.18. Verify windshield wiper and washer operations, replace wiper blades, and refill washer reservoir (where applicable).** **2.4.19. Inspect, repair to industry standards, and rotate tires and reset the tire pressure monitor system (TPMS). *(CTAG)** **2.4.20. Lubricate all suspension and chassis grease fittings and body lubrication points *(CTAG)** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**3.1. *Engine Cylinder Head and Block Assemblies/ Remove, disassemble and repair components in engine cylinder head and block assemblies*** ***(CTAG) [Perform a cooling system basic inspection, flush and fill on a vehicle]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R) 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 2. Reasearch applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins. P-1 6. Remove and replace timing belt; verify correct camshaft timing. P-1 7. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. P-1 ASE REQUIRED TASK LIST (ENGINE REPAIR) Cylinder Head and Valve Train Diagnosis and Repair: 1. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures. P-1 2. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition. P-1 3. Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action. P-2 4. Adjust valves (mechanical or hydraulic lifters). P-1 5. Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing. P-1 6. Establish camshaft position sensor indexing. P-1 **3.1.1. Describe the physical and mechanical principles of engine operation (i.e., motion, friction, thermodynamics).** **3.1.2. Calculate displacement and compare and contrast displacement, horsepower and torque.** **3.1.3. Compare and contrast two-cycle and four-cycle engines and their operating principles.** **3.1.4. Describe the features, benefits and application of engine types.** **3.1.5. Inspect an engine assembly for fuel, oil, coolant and other leaks and determine potential causes. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Removal and Reinstallation (R & R): 4. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. P-1

3.1.6. Diagnose engine noises and vibrations.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis

3. Diagnose abnormal engine noises or vibration concerns; determine necessary action. P-2

9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2

11. Verify correct camshaft timing. P-1

ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R):

8. Inspect, remove and replace engine mounts. P-2

ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Block Assembly Diagnosis and Repair:

1. Remove, inspect, or replace crankshaft vibration damper (harmonic balancer). P-2

ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:

9. Perform oil pressure tests; determine necessary action. P-1

3.1.7. Verify the engine operating temperature.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

10. Verify engine operating temperature; determine necessary action. P-1

ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair:

2. Identify causes of engine overheating. P-1

12. Inspect, test, and replace oil temperature and pressure switches and sensors. P-2

3.1.8. Diagnose causes of excessive oil consumption and unusual exhaust color and sound.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

4. Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine neceessasry action. P-2

3.1.9. Perform engine tests for vacuum, power balance, compression and leakage.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis:

5. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. P-1

6. Perform cylinder power balance test; determine necessary action. P-2

7. Perform cylinder cranking and running compression tests; determine necessary action. P-1

8. Perform cylinder leakage test; determine necessary action. P-1

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.2. *Computerized Engine Controls/ Perform diagnosis and repair of computerized engine controls.* *(CTAG) [Access onboard diagnostic system codes] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **3.2.1. Retrieve and record stored on-board diagnostics (OBD) trouble codes and clear codes where applicable. *(CTAG)** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. P-1 **3.2.2. Follow published diagnostic procedures and steps to identify the causes of emissions or drivability concerns resulting from malfunctions in the computerized engine control system with stored diagnostic trouble codes.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 2. Access and use service information to perform step-by-step (troubleshooting) diagnosis. P-1 4. Describe the importance of running all OBDII monitors for repair verification. P-1 **3.2.3. Check for module communication errors (e.g., controller area network [CAN], BUS systems).** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Accessories Diagnosis and Repair: 7. Check for module communication errors (including CAN/BUS systems) using a scan tool. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 **3.2.4. Inspect and test computerized engine control system sensors, powertrain control modules (PCMs), actuators and circuits.** ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Computerized Controls Diagnosis and Repair: 3. Perform active tests of actuators using a scan tool; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1

	3.2.5. Diagnose drivability and emissions problems resulting from malfunctions of interrelated systems (e.g., cruise control, security alarms, suspension controls, traction controls, air conditioning, automatic transmissions, non-original equipment manufacturer [OEM]-installed accessories). ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.3. *Ignition System/ Perform ignition system diagnosis and repair.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 3.3.1. Explain basic ignition system theory. 3.3.2. Diagnose and repair ignition system problems (i.e., no starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, power loss, emissions concerns) on vehicles with electronic and distributor ignition systems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 4. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1 3.3.3. Identify causes of cranks but fails to start, hard starting and starts but does not continue to run problems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1 3.3.4. Identify causes of surging, rough operation, misfiring, low power, slow deceleration, slow acceleration and shutdown problems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 1. Identify and interpret engine performance concerns; determine necessary action. P-1 3.3.5. Inspect and test ignition primary and secondary circuit wiring and solid state components. 3.3.6. Check and adjust ignition system timing and timing advance and retard.

	3.3.7. Inspect and test ignition system pickup sensor or triggering devices. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 2. Inspect and test crankshaft and camshaft position sensor(s); perform necessary action. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.4. ***Fuel, Air Induction and Exhaust System/ Perform fuel, air induction and exhaust system diagnosis and repair.*** ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 3.4.1. Explain principles of exhaust, intake and turbocharger design and operations. 3.4.2. Identify conditions of hot or cold no starting, hard starting, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling and emissions problems. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Ignition System Diagnosis and Repair: 1. Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor milage, and emissions concerns; determine necessary action. P-2 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair: 8. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emission control systems; determine necessary action. P-3 3.4.3. Check fuel for contaminants and quality. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 3.4.4. Inspect and test fuel pumps and pump control systems for pressure, regulation and volume. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 2. Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action. P-1 3.4.5. Inspect and test the cold enrichment system and components. ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair: 7. Verify idle control operation. P-1

3.4.6. Inspect the throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

5. Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air. P-2

3.4.7. Inspect and service governor systems.

3.4.8. Explain fuel injection theory.

3.4.9. Inspect and test fuel injectors.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

6. Inspect and test fuel injectors. P-2

3.4.10. Inspect the integrity of the exhaust manifold, exhaust pipes, mufflers, catalytic converters, resonators, tail pipes and heat shields.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

8. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action. P-1

9. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. P-1

3.4.11. Perform an exhaust system backpressure test.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

10. Perform exhaust system back-pressure test; determine necessary action. P-2

3.4.12. Evaluate and repair exhaust gas recirculation and exhaust gas treatment systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

3. Diagnose emissions, and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action. P-3

4. Inspect, test, service, and replace components of the EGR system including tubing, exhaust passages, vacuum/pressure controls, filters, and hoses; perform necessary action. P-2

3.4.13. Identify positive crankcase ventilation systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

1. Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action. P-3

2. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. P-2

3.4.14. Identify the parts and functions of evaporative emissions controls systems.

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Emission Control Systems Diagnosis and Repair:

7. Inspect and test components and hoses of the evaporative emissions control system; perform necessary action. P-1

3.4.15. Check and refill the diesel exhaust fluid (DEF) and service diesel particulate filter (DPF).

ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair:

11. Check and refill diesel exhaust fluid (DEF). P-2

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	3.5. *Lubrication and Cooling Systems/ Inspect lubrication and cooling systems operation.* *(CTAG) [Perform a cooling system basic inspection, flush and fill on a vehicle] ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 3.5.1. Explain principles of engine lubrication and cooling. 3.5.2. Perform lubrication, cooling system and pressure and sensor tests. 3.5.3. Inspect the oil pump gears or rotors, housing, pressure relief devices and pump drive. 3.5.4. Inspect, test and replace the radiator, pressure cap, coolant recovery tank and hoses. *(CTAG) ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 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, and heater core and gallery plugs; determine necessary action. P-1 3.5.5. Inspect and replace engine cooling and heater system hoses. *(CTAG) ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair: 1. Inspect engine cooling and heater systems hoses; perform necessary action. P-1 2. Inspect and test heater control valve(s); perform necessary action. P-2 3.5.6. Inspect, test and replace the thermostat and gasket. *(CTAG) ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 7. Remove, inspect, replace thermostat and gasket/seal. P-1 3.5.7. Test, drain, flush and refill coolant and bleed the cooling system. *(CTAG) ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 6. Remove and replace radiator. P-2 3.5.8. Inspect, remove and replace the water pump. *(CTAG) ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling Systems Diagnosis and Repair: 5. Inspect, remove, and replace water pump. P-2

	3.5.9. Inspect and test mechanical and electrical fans, fan clutches, fan shrouds and air dams. *(CTAG) ASE REQUIRED TASK LIST (ENGINE REPAIR) Lubrication and Cooling System Diagnosis and Repair: 8. Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.1. *Hydraulic Brake Systems/ Identify, inspect and replace hydraulic components of brake systems* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 4.1.1. Identify pressure concerns in the brake system using hydraulic principles (Pascal's Law). ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 1. Diagnose pressure concerns in the brake system using hydraulic principals (Pascal's Law). P-1 4.1.2. Identify poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system. ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 1. Identify and interpret brake system concerns; determine necessary actions. P-1 ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 5. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action. P-3 4.1.3. Measure brake pedal height and test pedal free play. ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 2. Measure brake pedal height, travel, and free play (as applicable); determine necessary action. P-1 4.1.4. Check the master cylinder for internal and external leaks and proper operations. ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 3. Check master cylinder for internal/external leaks and proper operation; determine necessary action. P-1 13. Test brake fluid for contamination. P-1 4.1.5. Remove, bench bleed and reinstall the master cylinder. ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 4. Remove, bench bleed, and reinstall master cylinder. P-1 9. Select, handle, store, and fill brake fluids to proper level. P-1

	4.1.6. Inspect brake lines for damage and wear. ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 6. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, and wear; check for loose fittings and supports; determine necessary action. P-1 7. Replace brake lines, hoses, fittings, and supports. P-2 **4.1.7. Fabricate and install rigid and flexible fluid lines and fittings.** ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 8. Fabricate brake lines using proper material and flaring procedures (double flare and ISO types). P-2 **4.1.8. Identify brake pressure valves.** ASE REQUIRED TASK LIST (BRAKES) Hydraulic System Diagnosis and Repair: 10. Inspect, test, and/or replace components of brake light warning light system. P-3 11. Identify components of a brake light warning system. P-2 **4.1.9. Check power assist operations (e.g., manifold or auxiliary pump vacuum supply to a vacuum type power booster).** ASE REQUIRED TASK LIST (BRAKES) Power-Assist Units Diagnosis and Repair: 1. Check brake pedal travel with, and without, engine running to verify proper power booster operation. P-2 2. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. P-1 3. Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation; determine necessary action. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.2. *Drum and Disc/ Identify, inspect and replace mechanical components of drum and disc brake systems.*** ***(CTAG) [Perform brake system inspection]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 **4.2.1. Identify poor stopping, noise, vibration, premature wear, pulling, grabbing, dragging, or pedal pulsation concerns.** ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair: 1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary actions. P-1 ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 1. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary actions. P-1

4.2.2. Remove the caliper assembly; clean; inspect for leaks, pad condition and damage; and replace.

ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair:

2. Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action. P-1

3. Clean and inspect caliper mounting and slides/pins for proper operation and wear, and damage; determine necessary action. P-1

4. Remove, inspect, and replace pads and retaining hardware; determine necessary action. P-1

5. Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks. P-1

11. Check brake pad wear indicator; determine necessary action. P-2

12. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. P-1

4.2.3. Remove, clean, inspect and measure drums and rotors. *(CTAG)

ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair:

2. Remove, clean, inspect, and measure brake drum diameter; determine necessary action. P-1

ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair:

6. Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral runout; determine necessary actions. P-1

4.2.4. Refinish drums and rotors.

ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair:

3. Refinish brake drum and measure final drum diameter; compare with specifications. P-1

ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair:

7. Remove and reinstall rotor. P-1

9. Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. P-1

4.2.5. Remove, inspect and replace wheel cylinders.

ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair:

5. Inspect wheel cylinders for leaks and proper operation; remove and replace as needed. P-2

4.2.6. Remove, clean, inspect and lubricate brake shoes, retaining hardware and adjustment hardware. *(CTAG)

ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair:

4. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. P-1

4.2.7. Pre-adjust brake shoes, seat the pads and adjust the parking brake system. *(CTAG)

ASE REQUIRED TASK LIST (BRAKES) Drum Brake Diagnosis and Repair:

6. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments. P-2

ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair:

3. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. P-2

4.2.8. Lubricate drum and disc brake assembly components, reinstall and inspect for leaks.*(CTAG)

	4.2.9. Check the condition and operation of the parking brake and clean, lubricate, or replace as needed. *(CTAG) ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 4. Check parking brake operation and parking brake indicator light system operation; determine necessary action. P-1 4.2.10. Check the operation of parking brake indicator light and brake stop light systems. ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 5. Check operation of brake stop light system. P-1 4.2.11. Inspect and adjust the caliper piston on an integral parking brake system. ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 10. Retract and re-adjust caliper piston on an integrated parking brake system. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.4. ***Antilock Brakes/ Identify, inspect and replace antilock brake systems.*** ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 4.4.1. Identify and inspect antilock brake system (ABS) components. 4.4.2. Identify poor stopping, wheel lock-up, abnormal pedal feel or pulsation and noise concerns caused by the ABS. ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis: 3. Describe procedure for performing a road test to check brake system operation; including an anti-lock brake system (ABS). P-1 4.4.3. Identify ABS braking concerns caused by vehicle modifications (e.g., tire size, curb height, final drive ratio). 4.4.4. Identify ABS electronic controls and components. 4.4.5. Depressurize high-pressure components and bleed front and rear hydraulic circuits. 4.4.6. Re-adjust the caliper piston on an integral parking brake system. ASE REQUIRED TASK LIST (BRAKES) Disc Brake Diagnosis and Repair: 10. Retract and re-adjust caliper piston on an integrated parking brake system. P-3 4.4.7. Remove and install ABS electrical and/or electronic and hydraulic components.

	4.4.8. Interpret the output signal, resistance charts to voltage/ground and frequency data. 4.4.9. Identify traction control and/or vehicle stability control system components. ASE REQUIRED TASK LIST (BRAKES) Electronic Brake, Traction and Stability Control Systems Diagnosis and Repair: 2. Identify Traction control/vehicle stability control system components. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.5. ***Electrical and Electronic Systems/ Diagnose the electrical and electronic integrity of series, parallel and series-parallel circuits using principles of electricity (e.g., Ohm's Law, Watt's Law).*** ***(CTAG) [Perform starting and charging system inspection and test]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 4.5.1. Interpret wiring diagrams of electrical circuits. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 7. Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems. P-1 4.5.2. Measure the source voltage and perform voltage drop and current draw tests in electrical and electronic circuits. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 3. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance. P-1 4.5.3. Measure current, continuity and resistance. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (ohm's Law). P-1 4.5.4. Identify capacitance and inductance.

	4.5.5. Inspect and test switches, connectors, relays, solenoid, solid state devices and wires of electrical and electronic circuits. ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 10. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action. P-1 **4.5.6. Remove and repair or replace terminal connectors.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 11. Replace electrical connectors and terminal ends. P-1 **4.5.7. Perform solder repair of electrical wiring.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 12. Repair wiring harness. P-3 13. Perform solder repair of electrical wiring. P-1 **4.5.8. Locate shorts, grounds, opens and resistance problems in electrical and electronic circuits.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 4. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-1 5. Check operation of electrical circuits with a test light. P-1 6. Check operation of electrical circuits with fused jumper wires. P-1 ASE REQUIRED TASK LIST (ENGINE PERFORMANCE) General: Engine Diagnosis: 9. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action. P-2 **4.5.9. Measure and diagnose the causes of excessive key-off battery drain (parasitic draw).** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 8. Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action. P-1 **4.5.10. Inspect, test and replace or reset fusible links, circuit breakers and fuses.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) General: Electrical System Diagnosis: 9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.6. *Batteries/ Diagnosis and service batteries.*** ***(CTAG) [Perform starting and charging system inspection and test]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **4.6.1. Identify battery construction and principles of operation.** **4.6.2. Test battery performance using state-of-charge and conductance tests and record test results. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 1. Perform battery state-of-charge test; determine necessary action. P-1 **4.6.3. Confirm proper battery capacity for vehicle application and perform a battery capacity test.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. P-1 **4.6.4. Maintain or restore electronic memory functions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 3. Maintain or restore electronic memory functions. P-1 8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. P-1 **4.6.5. Perform a battery charge. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 5. Perform slow/fast battery charge according to manufacturer's recommendations. P-1 **4.6.6. Start a vehicle using jumper cables and a battery or auxiliary power supply using manufacturer's jumping techniques and precautions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1 **4.6.7. Remove and replace a battery.** ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.7. *Starting and Charging Systems/ Identify, inspect and replace starting and charging system components.*** ***(CTAG) [Perform starting and charging system inspection and test]** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **4.7.1. Differentiate between electrical and engine mechanical problems that cause a slow crank or no crank condition.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Starting System Diagnosis and Repair: 1. Perform starter current draw tests; determine necessary action. P-1 2. Perform starter circuit voltage drop tests; determine necessary action. P-1 3. Inspect and test starter relays and solenoids; determine necessary action. P-2 5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. P-2 6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition. P-2 **4.7.2. Inspect, test and replace low and high current side components.** **4.7.3. Perform charging system output tests to identify causes of undercharge, no charge and overcharge conditions. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 1. Perform charging system output test; determine necessary action. P-1 2. Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions. P-1 5. Perform charging circuit voltage drop tests; determine necessary action. P-1 **4.7.4. Inspect and adjust or replace alternator drive belts, pulleys and tensioners and check pulley and belt alignment. *(CTAG)** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 3. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. P-1 **4.7.5. Remove, inspect and install an alternator and starter.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Starting System Diagnosis and Repair: 4. Remove and install a starter in a vehicle. P-1 ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Charging System Diagnosis and Repair: 4. Remove, inspect, and re-install generator (alternator). P-1

	4.7.6. Identify the high voltage circuit of electric or hybrid electric vehicles and related safety precautions. *(CTAG) ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Battery Diagnosis and Service: 7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. P-3 ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY: 14. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**4.8. *Lighting and Accessories/ Identify, inspect, and replace electrical and electronic components of lighting systems and accessories.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order, 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **4.8.1. Identify the cause of brighter than normal, intermittent, dim, or no light operation.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Lighting System Diagnosis and Repair: 1. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action. P-1 2. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1 **4.8.2. Inspect, replace and aim headlights and bulbs.** ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEMS) Lighting System Diagnosis and Repair: 3. Aim headlights. P-2 **4.8.3. Identify and inspect incorrect turn signal or hazard light operation.** **4.8.4. Identify and inspect brake light circuit switches, wiring and connectors.** **4.8.5. Identify system voltage and safety precautions associated with (HID) high-intensity discharge headlights.**

4.8.6. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair:

1. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action. P-2

2. Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action. P-2

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

9. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P-1

4.8.7. Identify incorrect horn operation.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair:

1. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action. P-1

4.8.8. Identify incorrect wiper and washer operation and replace.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Horn and Wiper/Washer Diagnosis and Repair:

2. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2

3. Diagnose (troubleshoot) windshield washer problems; perform necessary action. P-2

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

10. Verify windshield wiper and washer operation, replace wiper blades. P-1

4.8.9. Identify incorrect operation of motor-driven accessories.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

1. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action. P-2

4.8.10. Identify incorrect heated glass, mirror, or seat operation and repair.

4.8.11. Identify incorrect electric lock operation and repair.

4.8.12. Identify airbag supplemental restraint system (SRS) concerns.

ASE REQUIRED SUPPLEMENTAL TASK—SHOP and PERSONAL SAFETY:

14. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits, voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONICS) Accessories Diagnosis and Repair:

4. Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action. P-2

4.8.13. Identify safety concerns for disarming and enabling the airbag system for vehicle service.

ASE REQUIRED TASK LIST (ELECTRICAL/ELECTRONIC SYSTEM) Accessories Diagnosis and Repair:

5. Disable and enable an airbag system for vehicle service; verify indicator lamp operation. P-1

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	4.9. *Heating, Ventilation and Air Conditioning Systems/ Diagnose and repair heating, ventilation and air conditioning (HVAC) system components and controls.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 1. Identify and interpret heating and air conditioning problems; determine necessary action. P-1 2. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 3. Performance test A/C system; identify problems. P-1 4. Identify abnormal operating noises in the A/C system; determine necessary action. P-2 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 10. Inspect evaporator housing water drain; perform necessary action. P-1 11. Determine procedure to remove and reinstall evaporator; determine required oil quantity. P-2 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Operating Systems and Related Controls Diagnosis and Repair: 1. Inspect and test A/C –heater blower motors, resistors, switches, relays, wiring, and protection devices; perform necessary action. P-1 2. Diagnose A/C compressor clutch control system; determine necessary action. P-2 3. Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action. P-2 5. Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action. P-3 6. Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. P-1 8. Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; Determine necessary action. P-2 **4.9.1. Identify the major components of the HVAC system, their functions and the overall operation of the system.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 1. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. P-1 3. Remove, inspect, and install A/C compressor and mountings; determine recommended oil quanity. P-2 7. Inspect A/C condenser for airflow restrictions; perform necessary action. P-1 8. Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine recommended oil quantity. P-2

	4.9.2. Perform pressure and leak testing. ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 5. Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings. P-1 6. Leak test A/C system; determine necessary action. P-1 **4.9.3. Identify air conditioning (A/C) system mufflers, hoses, lines, fittings, O-rings, seals, condenser and service valves.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigeration System Component Diagnosis and Repair: 6. Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action. P-2 9. Remove, inspect, and install expansion valve or orifice (expansion) tube. P-1 **4.9.4. Handle, identify, recover and store recycled refrigerant.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigerant Recovery, recycling, and Handling: 1. Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards. P-1 3. Recycle, label, and store refrigerant. P-1 **4.9.5. Evacuate and charge the A/C system.** ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) General: A/C System Diagnosis and Repair: 7. Inspect condition of refrigerant oil removed from A/C system; determine necessary action. P-2 8. Determine recommended oil and oil capacity for system application. P-1 ASE REQUIRED TASK LIST (HEATING and AIR CONDITIONING) Refrigerant Recovery, recycling, and Handling: 4. Evacuate and Charge A/C system; add refrigerant oil as required. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.1. *Automatic Transmission and Transaxle Performance/ Identify, inspect, adjust, and replace automatic transmissions and transaxles.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis; 1. Indentify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action. P-1 ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) In-Vehicle Transmission/Transaxle Maintenance and Repair: 1. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. P-2 3. Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harness. P-1 **5.1.1. Research applicable vehicle and service information (e.g., transmission and transaxle system operation, fluid type, vehicle service history, service precautions, technical service bulletins).** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis; 2. Research applicable vehicle and service information fluid type, vehicle service history, service precautions, and technical service bulletins. P-1 **5.1.2. Locate and interpret vehicle and major component identification numbers (i.e., vehicle identification number [VIN], vehicle certification labels, calibration decals).** **5.1.3. Investigate fluid loss and condition concerns.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) General: Transmission and Transaxle Diagnosis; 4. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1 **5.1.4. Inspect powertrain mounts.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) In-Vehicle Transmission/Transaxle Maintenance and Repair: 5. Inspect, replace and align power train mounts. P-2 **5.1.5. Remove and reinstall the transmission, transaxle and torque converter.** ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) Off-Vehicle Transmission/Transaxle Repair: 1.Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces. P-1

	5.1.6. Inspect for leaks on cooler lines and fittings. ASE REQUIRED TASK LIST (AUTOMATIC TRANSMISSION) Off-Vehicle Transmission/Transaxle Repair: 2.Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.),

Outcome/I Can	**5.2.** ***Manual Transmission and Transaxle/ Diagnose and repair manual transmissions and transaxles.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis: Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) General: Drive Train Diagnosis: 1. Identify and interpret drive train concerns; determine necessary action. P-1 2. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. P-1 3. Check fluid condition; check for leaks; determine necessary action. P-1 4. Drain and refill manual transmission/transaxle and final drive unit. P-1 **5.2.1.** Identify the major components of manual transmissions, their function and the overall operation of manual transmissions. **5.2.2.** Inspect, test and replace transmission and transaxle sensors and switches. ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.),

Outcome/I Can	**5.3.** ***Clutches/ Identify and inspect clutches.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis: Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **5.3.1.** Identify clutch noise, binding, slippage, pulsation and chatter. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 1. Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action. P-1

	5.3.2. Inspect the clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 2. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Transmission/Transaxle Diagnosis and Repair: 1. Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers. P-2 **5.3.3. Inspect the hydraulic clutch slave and master cylinders, lines and hoses.** **5.3.4. Inspect and replace the clutch pressure plate assembly and clutch disc.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 3. Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable). P-1 **5.3.5. Bleed the clutch hydraulic system.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 4. Bleed clutch hydraulic system. P-1 **5.3.6. Inspect and measure the flywheel run-out, crankshaft endplay and ring gear for wear and cracks.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 6. Inspect flywheel and ring gear for wear and cracks; determine necessary action. P-1 **5.3.7. Check and adjust the clutch master cylinder levels and check for leaks.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Clutch Diagnosis and Repair: 5. Check and adjust clutch master cylinder fluid level; check for leaks. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.4. *Drive Axle Universal and Differentials/ Identify, inspect, and replace drive axle differential components.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Four Wheel Drive/All Wheel Drive Component Diagnosis and Repair: 1. Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets. P-3 2. Inspect front-wheel bearings and locking hubs; perform necessary action(s). P-3 3. Check for leaks at drive assembly seals; check vents; check lube level. P-3 4. Identify concerns related to variations in tire circumference and/or final drive ratios. P-3

	5.4.1. Identify and inspect drive axle and differential assemblies for noise, vibration and fluid leakage concerns. ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 1. Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action. P-1 2. Diagnose universal joint noise and vibration concerns; perform necessary action. P-2 **5.4.2. Service and replace the shaft, yokes, boots and joints.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 4. Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. P-1 **5.4.3. Replace drive axle seals, bearings and retainers.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair: 3. Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. P-1 ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Drive Axles: 2. Remove and replace drive axle shafts. P-1 3. Inspect and replace drive axle shaft seals, bearings, and retainers. P-2 **5.4.4. Inspect, adjust and replace drive belts and chains.** **5.4.5. Inspect and replace drive axle housing cover plates, gaskets, sealants, vents, plugs and seals.** ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Ring and Pinion Gears and Differential Case Assembly: 1. Clean and inspect differential housing; check for leaks; inspect housing vent. P-2 2. Check and adjust differential housing fluid level. P-1 3. Drain and refill differential housing. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	**5.5. *Steering/ Identify steering system components.*** **ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED*** **ASE REQUIRED TASKS are *UNDERLINED***
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (SUSPENSION and STEERING) General: Suspension and Steering Systems: 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 4. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. P-2 5. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action. P-2

	5.5.1. Disable and enable the supplemental restraint system (SRS). ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 1. Disable and enable supplemental restraint system (SRS). P-1 **5.5.2. Remove and replace the steering wheel and center and time the SRS coil (clock spring).** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 2. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring). P-1 **5.5.3. Inspect steering shaft universal joints and flexible couplings.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 6. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action. P-2 **5.5.4. Remove, inspect, replace and adjust the power steering pump belt, power steering pump, power steering pump pulley, hoses and fittings and check pulley and belt alignment.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 11. Inspect for power steering fluid leakage;determine necessary action. P-1 12. Remove, inspect, replace, and adjust power steering pump drive belt. P-1 13. Remove and reinstall power steering pump. P-2 14. Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment. P-2 15. Inspect and replace power steering hoses and fittings. P-2 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 3. describe the function of the power steering switch. P-3 **5.5.5. Inspect and replace the pitman arm, relay rod (center-link/intermediate), idler arm and mountings and steering linkage damper.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 16. Inspect and replace the pitman arm, relay (center-link/intermediate) rod, idler arm and mountings, and steering linkage damper. P-2 **5.5.6. Inspect, replace and adjust tie rod ends (sockets), tie rod sleeves and clamps.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Steering Systems Diagnosis and Repair: 8. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed. P-2 17. Inspect, replace, and adjust tie rods ends (sockets), tie rod sleeves, and clamps. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.6. *Suspension/Remove, inspect and install front and rear suspension.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats, ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) **5.6.1. Identify short arm and long arm suspension system components.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 1. Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action. P-1 **5.6.2. Identify strut suspension system components.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 2. Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action. P-1 **5.6.3. Remove, inspect and install upper and lower control arms, bushings, shafts, upper and lower ball joints and rebound bumpers.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 3.Inspect, remove and install upper and lower control arms, bushings, shafts, and rebound bumpers. P-3 5. Inspect, remove and install upper and/or lower ball joints (with or without wear indicators). P-2 **5.6.4. Remove, inspect and install strut rods (compression and tension) and bushings.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 4. Inspect, remove and install strut rods and bushings. P-3 **5.6.5. Remove, inspect and install steering knuckle assemblies.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 6. Inspect, remove and install steering knuckle assemblies. P-3 **5.6.6. Remove, inspect and install short arm and long arm suspension system coil springs and spring insulators.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 7. Inspect, remove and install short and long arm suspension system coil springs and spring insulators. P-3 **5.6.7. Remove, inspect, install and adjust suspension system torsion bars and stabilizer bar bushings, brackets and links and inspect mounts.** ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 8. Inspect, remove and install torsion bars and mounts. P-3 9. Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links. P-3

	5.6.8. Remove, inspect and install a strut cartridge or assembly, strut coil spring, insulators (silencers) and upper strut bearing mount. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 10. Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. P-3 5.6.9. Remove, inspect and install transverse links, control arms, bushings and mounts. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 11. Inspect, remove and install track bar, strut rods/radius arms, and related mounts and bushings. P-3 5.6.10. Remove, inspect and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings and mounts. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Suspension Systems Diagnosis and Repair: 12. Inspect rear suspension leaf spring(s), bushings, center pins/bolts, and mounts. P-1 5.6.11. Inspect, remove and replace shock absorbers. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 1. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. P-1 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.7. *Wheel Alignment/ Inspect and adjust wheel alignment.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) 5.7.1. Inspect, remove and replace shock absorbers and inspect mounts and bushings. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 1. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. P-1 5.7.2. Replace front and rear wheel bearings. ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair: 2. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. P-1 6. Replace wheel bearing and race. P-2 8. Remove and reinstall sealed wheel bearing assembly. P-2 ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 2. Remove, inspect, and service or replace front and rear wheel bearings. P-1

	5.7.3. Identify vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, ride height and steering return concerns. 5.7.4. Check and adjust wheel caster, camber and toe and center the steering wheel. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service: 2. Perform prealignment inspection and measure vehicle ride height; perform necessary action. P-1 3. Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel. P-1 4. Check toe-out-on-turns (turning radius); determine necessary action. P-2 5. Check SAI (steering axis inclination) and included angle; determine necessary action. P-2 6. Check rear wheel thrust angle; determine necessary action. P-1 7. Check for front wheel setback; determine necessary action. P-2 8. Check front and/or rear cradle (subframe) alignment; determine necessary action. P-3 ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER: 1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

Outcome/I Can	5.8. *Wheels and Tires/ Identify, inspect, and replace wheel and tire components and assemblies.* ASE REQUIRED SUPPLEMENTAL TASKS are *UNDERLINED* ASE REQUIRED TASKS are *UNDERLINED*
Competencies	ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE: 1. Identify information needed and the service requested on a repair order. 2. Identify purpose and demonstrate proper use of fender covers, mats. ASE REQUIRED TASK LIST (ENGINE REPAIR) General: Engine Diagnosis; Remove and Reinstallation (R&R): 1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1 (also ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for SERVICE #5) ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 5. Diagnose tire pull problems: determine necessary. P-2 7. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-2 8. Inspect tire and wheel assembly for air loss; perform necessary action. P-1 9. Repair tire using internal patch. P-1 5.8.1. Identify tire wear patterns and tire construction. ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair: 1. Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action. P-1 3. Rotate tires according to manufacturer's recommendations. P-1

5.8.2. Identify bearing noises and wheel vibration, shimmy, and noise.

ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair:

1. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary actions. P-3

ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair:

2. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action. P-2

5.8.3. Measure wheel, tire, axle, and hub run-out.

ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Related Suspension and Steering Service:

4. Measure wheel, tire, axle flange, and hub runout; determine necessary action. P-2

5.8.4. Balance wheel and tire assembly.

ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair:

6. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). P-1

5.8.5. Remove, inspect, and reinstall tire and wheel assembly and calibrate tire pressure monitoring system.

ASE REQUIRED TASK LIST (SUSPENSION and STEERING) Wheels and Tires Diagnosis and Repair:

10. Identify and test tire pressure monitoring system (indirect and direct) for operation; verify operation of instrument panel lamps. P-2

11. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. P-1

5.8.6. Inspect and replace wheel studs.

ASE REQUIRED TASK LIST (BRAKES) General: Brake System Diagnosis:

4. Install wheel and torque lug nuts. P-1

ASE REQUIRED TASK LIST (BRAKES) Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair:

7. Inspect and replace wheel studs. P-1

ASE REQUIRED TASK LIST (MANUAL DRIVE TRAIN and AXLES) Drive Axle Diagnosis and Repair/ Drive Axles:

1. Inspect and replace drive axle wheel studs. P-1

ASE REQUIRED SUPPLEMENTAL TASK—PREPARING VEHICLE for CUSTOMER:

1. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

STUDENT ASSESSMENT POLICY
AUTOMOTIVE TECHNOLOGY
WEST SHORE CAREER AND TECHNICAL EDUCATION DISTRICT

Automotive Technology students shall perform competencies (tasks) that directly or indirectly relate to items outlined in this course of study. These competencies (tasks) meet industry standards set forth by NATEF/ASE. These competencies (tasks) are approved and adopted by the local Board of Education and Advisory Committee of the Automotive Technology Program.

In order to measure student progress in the AUTOMOTIVE TECHNOLOGY PROGRAM, the following procedures listed below will be used:

- **Pre-testing**
- **Post testing**
- **WEBXAM testing**
- **ASE on-line testing**
- **Classroom lectures/discussions**
- **Lab observation by instructor**
- **Lab performance evaluation by student**
- **Chapter testing grades**
- **Daily attendance**
- **Board of Education rules and regulations for early placement**
- **Job shadowing**
- **Job interview task**

The measurement of learning will be ongoing using classroom lessons with testing and hands-on lab activities. Evaluation will be accomplished through pre-assessment of the students skills, frequent formative assessment; visual and written, and summative evaluation to determine the mastery of competencies. Formative assessments that are conducted during the instruction help the instructor make necessary instructional adjustments. The instructor will decide how to alter instructional methods and materials if student(s) are experiencing learning specific lessons. All evaluations are in the form of points received out of possible points. A percentage is calculated and a letter grade is given on "PROGRESS BOOK". Parents and students can track progress and assignments on "PROGRESS BOOK". Quarterly grades, mid-term exam, and final exam grades are posted on "PROGRESS BOOK".

<u>Grading scale:</u>

A+ = 96.50%-100.00%
A = 92.50%-96.49%
A- = 89.50%-92.49%
B+ = 86.50%-89.49%
B = 82.50%-86.49%
B- = 79.50%-82.49%
C+ = 76.50%-79.49%
C = 72.50%-76.49%
C- = 69.50%-72.49%
D+ = 66.50%-69.49%
D = 62.50%-66.49%
D- = 59.50%-62.49%
F = 00.00%-59.49%