



**SANTA CLARA COUNTY OFFICE OF EDUCATION
SANTA CLARA COUNTY REGIONAL OCCUPATIONAL PROGRAM
Serving Santa Clara and San Benito Counties**



1. COURSE TITLE – CAREER TECHNICAL EDUCATION PATHWAY/SECTOR

Automotive Mechanics - Automotive Technology/Transportation

2. CBEDS TITLE

Automotive Mechanics, Combination

3. CBEDS NUMBER

5655

4. JOB TITLES

O*NET	TITLE
49-3021.00	Body Shop Assistant
49-3023.00	Automotive Mechanic/Mechanic's Assistant
49-3023.02	Specialty Technician/ Chassis Worker
49-3021.00	Auto Body Repairer

5. COURSE DESCRIPTION

The Automotive Technology program is designed to provide students with the necessary skills, knowledge and abilities for entry-level employment in the automotive service industry. It provides the student with skills in tune-up, brake system, electrical systems, lamp adjustments, lubrication service and parts management. Students will also learn job search skills, business ethics, appropriate communication skills for the marketplace, and job retention skills - including attendance, punctuality and proper work attire.

6. HOURS

Classroom Theory/Applied	260
Community Classroom/Coop Voc Ed	100
TOTAL HOURS	360

7. RECOMMENDED PREREQUISITE

Required	Must be 16 years of age or older, a junior or senior in high school, an out-of-school youth, or an adult.
Recommended	None

**8. DATE REVISED 8/31/07
UPDATED 3/20/09**

9. COURSE OUTLINE			
A. Career Preparation Skills			
Class Hours	CC/CVE Hours	GENERAL WORKPLACE SKILLS	Standards
30	Integrated throughout the course	<ul style="list-style-type: none"> • Attitude and Work Habits 1. Works both independently and collaboratively 2. Attends regularly and on time 3. Practices good safety procedures 4. Solves problems thinks critically and makes good decisions 5. Plans work and takes initiative 6. Demonstrates leadership and the willingness to help train others <ul style="list-style-type: none"> • Job Employment Skills 1. Develop a plan to achieve career goals 2. Complete a career portfolio 3. Use effective job search strategies 4. Perform employment research 5. Complete job application and resume 6. Develop effective interviewing and follow-up skills. 7. Demonstrate an awareness of importance of lifelong learning. 	<p>CPS: Personal Skills; Interpersonal Skills</p> <p>SCANS: Personal Qualities; Interpersonal Qualities</p> <p>CPS: Employment Literacy</p>

Sources:
 CPS - *Career Preparation Standards*. California Department of Education and WestEd
 SCANS - *What Work Requires of Schools: A SCANS Report of America 2000*.
 The Secretary's Commission on Achieving Necessary Skills, Publication of the US Dept. of Labor, June 1991.
Career Technical Education Model Curriculum Standards. California Department of Education. May 2005

B. Career Technical Skills								
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS			Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
4	2	I. Principals of Suspension Design			* See attached pages that follow			
		A. Identify suspension construction/frames 1. Frames 2. Body function 3. Component relationship B. Identify suspension types 1. Coil spring 2. Leaf spring 3. Torsion bar 4. Strut C. Identify suspension function 1. Parts operation as a unit 2. Component relationship as a system			1.0 (pg. 346)	T M M	C8.6 (pg. 363) C8.4 (pg. 363)	M T T T
3	2	II. Operation of Individual Components						
		A. Recognize and state purpose of 1. Bushing (Placement & Function) 2. Ball joints 3. Control arms 4. Sway bars 5. Shackles 6. Shock absorbers			5.0 5.1 (pg. 354)	T R	C8.4 (pg. 363) C8.3 (pg. 363)	M T
4	2	III. Inspection of Parts						
		A. Visually inspect 1. Frames 2. Springs/torsions 3. Bushings 4. Ball joints 5. Control arms 6. Sway bars 7. Shackles 8. Shocks B. Manually inspect 1. Ball joints 2. Shock absorbers			10.0 (pg. 355) 10.1 (pg. 355)	T R	C8.0 (pg. 363) C8.3 (pg. 363)	M M T M T T

Career Technical Skills								
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS			Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
5	3	IV. Steering Systems						
		A. Identify steering constructions		10.4 (pg. 355)	T			
		1. Large car operation						
		2. Small car operation						
		B. Compare steering types		5.0 (pg. 354)	R	C8.1 C8.3 (pg. 363)	T	
		1. Rack and pinion		10.0 (pg. 355)	M		T	
		2. Pitman/idler arm-conventional type					M	
		C. Inspect steering components					T	
		1. Tie rods					M	
		2. Idler arm					M	
		3. Pitman arm					T	
		4. Rack and pinion					M	
		5. Steering box-worm and sector						
5	3	V. Wheel Bearings						
		A. Analyze the design and operation of					M	
		1. Ball						
		2. Roller		5.0 (pg. 354)	T	C8.2 (pg. 363)		
		B. Explain service and inspection protocol		10.0 (pg. 355)	R	C2.2 (pg. 361)	T	
		1. Removal and inspection				C3.7 (pg. 362)		
		2. Cleaning and inspection					T	
		3. Replacement					M	
		4. Adjustment						
		5. Diagnostic steps						
3	2	VI. Tires and Wheel						
		A. Examine the design and construction of tires						
		1. Bias		5.0 (pg. 354)	M	C2.6 (pg. 361)	T	
		2. Belted		10.0 (pg. 355)	M	C8.5 (pg. 363)		
		3. Radial						
		4. Plies						
		5. Examine the design and construction of wheels						

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
6	3	VII. Tires- Service – Repair - Balancing				
		A. Conduct a tire servicing 1. Tire changer operation 2. Mount and dismount B. Demonstrate a tire repair 1. Patch 2. Plug 3. Thread C. Balancing 1. Understand the theory of balance 2. Identify a bubble 3. Detect static 4. Explain dynamic 5. Perform an “On car spin”	10.5 (pg. 355) 10.0 (pg. 355)	T R	C1.5 (pg. 361) C3.7 (pg. 362) C2.2 (pg. 361) C1.5 (pg. 361)	T M T T T M T
4	2	VIII. Replacement of Minor Suspension Components				
		A. Demonstrate a tire replacement 1. Shocks 2. Tie rod ends 3. Idler arms 4. Ball	6.0 6.3 (pg. 354)	T R	C2.0 (pg. 361) C8.5 C8.6 (pg. 363) C1.5 (pg. 361)	T
4	2	IX. Theory of Automotive Clutch				
		A. Identify the components of clutch 1. Flywheel 2. Pressure plate 3. Disc 4. Throw out bearing B. Restate the principle of clutch operation 1. Component relationship 2. Diagnostic steps	10.0 (pg. 355)	R	C8.4 (pg. 363) C3.7 (pg. 362) C1.5 (pg. 361) C8.0 (pg. 363)	T T M

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
6	3	X. Basic Clutch Service & Maintenance				
		A. Demonstrate a clutch removal <ol style="list-style-type: none"> 1. Safety steps 2. Drive line and transmission removal 3. Clutch removal 4. Inspection steps B. Perform clutch maintenance <ol style="list-style-type: none"> 1. Adjustments 	10.0 (pg. 355) 6.0 (pg. 354)	M M	C8.4 (pg. 363) C1.5 C2.1 C2.2 C2.6 (pg. 361)	T M
6	4	XI. Theory of Standard Transmission				
		A. Describe the principles of operation <ol style="list-style-type: none"> 1. Gears and ratios 2. Shafts, bearings, and bushings 3. Synchros, sleeves, and hubs B. Practice simple troubleshooting <ol style="list-style-type: none"> 1. Noise 2. Vibration 3. Shift quality 	10.1 (pg. 355)	T	C1.5 C2.1 (pg. 361) C8.4 (pg. 363) C3.7 (pg. 362)	M T
		C. Explain basic service and repair <ol style="list-style-type: none"> 1. Oil change 2. Linkage adjustment and service 3. Tailshaft bushing and seal replacement 	10.4 10.5 (pg. 355)	T T	C2.2 C1.5 C1.2 (pg. 361)	
3	2	XII. Automotive Transmission Basic Operation				
		A. Identify parts of a converter <ol style="list-style-type: none"> 1. Stator 2. Turbine 3. Impeller B. Explain the oil pump cooler <ol style="list-style-type: none"> 1. Operation 2. Lines 3. Cooler C. Describe the gear set operation <ol style="list-style-type: none"> 1. Sun 2. Planetary 3. Carrier 	10.0 (pg. 355)	M	C8.1 C8.4 (pg. 363) C3.7 (pg. 362) C1.5 (pg. 361)	M T

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
10	6	XIII. Automatic Transmission Maintenance and Simple Cures				
		<ul style="list-style-type: none"> A. Perform an oil change <ul style="list-style-type: none"> 1. Transmission 2. Converter 3. Filter B. Perform a band adjustment <ul style="list-style-type: none"> 1. Ford 2. Chrysler C. Analyze the linkage <ul style="list-style-type: none"> 1. Adjustments 2. Minor repairs D. Recognize oil leaks <ul style="list-style-type: none"> 1. Location 2. Repair techniques 	11.0 (pg. 355)	T	C8.1 C8.4 (pg. 363)	T
			10.0 (pg. 355)	M	C1.5 C1.2 (pg. 361)	
					C3.7 (pg. 362)	T
9	5	XIV. Drive Shaft and U Joints				
		<ul style="list-style-type: none"> A. Study the drive shaft <ul style="list-style-type: none"> 1. One piece 2. Two piece B. Examine U joints <ul style="list-style-type: none"> 1. Ball and trunnion 2. Roller and cross 3. Constant velocity C. Inspect drive shaft and U joint <ul style="list-style-type: none"> 1. Drive shaft 2. U joints 3. Support bearings 4. Yoke 5. Miscellaneous D. Perform basic service/replacement <ul style="list-style-type: none"> 1. U joints 2. Bearings 	10.0 11.0 (pg. 355)	M M	C8.6 (pg. 363) C3.7 (pg. 362) C1.5 (pg. 361)	T T
					C2.1 C2.2 (pg. 361)	
					B2.1 (pg. 358)	T M

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
6	4	XV. Theory of Rear Axle System				
		<ul style="list-style-type: none"> A. Discuss the carrier assembly <ul style="list-style-type: none"> 1. Ring and pinion 2. Spider gears 3. Side gears 4. Bearings B. Define the basic operation <ul style="list-style-type: none"> 1. Gear sets 2. Straight line/turn C. Evaluate axles and bearings <ul style="list-style-type: none"> 1. Styles 2. Replacement 	10.4 11.0 (pg. 355)	T M	C8.6 (pg. 363) C2.1 C2.2 C1.5 (pg. 361)	T M
4	3	XVI. Rear Axle Maintenance & Basic Service				
		<ul style="list-style-type: none"> A. Discuss axle bearing and seals <ul style="list-style-type: none"> 1. Diagnostic 2. Replacement B. Perform basic service <ul style="list-style-type: none"> 1. Oil change 	11.0 (pg. 355)	M	C8.6 (pg. 363) C3.7 (pg. 362) C1.2 C1.5 (pg. 361)	T M
5	2	XVII. Theory of Automotive Braking Systems				
		<ul style="list-style-type: none"> A. Explain the theory of <ul style="list-style-type: none"> 1. Friction 2. Heat energy B. Discuss the evolution of <ul style="list-style-type: none"> 1. Mechanical 2. Hydraulic 3. 2 wheel braking 4. 4 wheel braking 	10.0 (pg. 355)	T	C1.5 (pg. 361) C8.2 C8.3 (pg. 363)	T T M T

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
20	10	XIX. Basic Hydraulic System Operation				
		<ul style="list-style-type: none"> A. Explain fluids <ul style="list-style-type: none"> 1. Laws 2. Pressure 3. Force B. Recognize the Master Cylinder <ul style="list-style-type: none"> 1. Single 2. Dual 3. Parts 4. Operation C. Discuss and analyze the pressure differential switch <ul style="list-style-type: none"> 1. Operation 2. Testing and adjustment D. Discuss and analyze the proportioning valve <ul style="list-style-type: none"> 1. Operation 2. Testing E. Discuss and analyze the metering valve <ul style="list-style-type: none"> 1. Operation 2. Testing F. Discuss and analyze the wheel cylinders <ul style="list-style-type: none"> 1. Parts 2. Operation 	10.4 (pg. 355)	T	C8.2 (pg. 363) C3.3 C3.7 C3.5 (pg. 362) C1.5 (pg. 361) C3.7 (pg. 362) C8.6 (pg. 363)	T M M M M

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
15	4	XX. Drum Brake System Components & Operation				
		A. Brake drum <ol style="list-style-type: none"> 1. Sketch the construction of 2. Identify function B. Backing plate <ol style="list-style-type: none"> 1. Evaluate design 2. Explain the operation C. Brake linings and shoes <ol style="list-style-type: none"> 1. Examine materials 2. Point out the position 3. Describe operation 4. Test friction D. Springs and linkage <ol style="list-style-type: none"> 1. Explain the operation 2. Describe the placement 	11.0 (pg. 355)	R	C8.2 (pg. 363) C3.7 C3.3 (pg. 362) C1.5 (pg. 362)	T T T T
5	3	XXI. Disc Brake System Components & Operation				
		A. Disc <ol style="list-style-type: none"> 1. Sketch the construction of 2. Identify function B. Caliper <ol style="list-style-type: none"> 1. Recognize style 2. Explain the operation 3. Describe the placement of C. Pads <ol style="list-style-type: none"> 1. Identify material 2. Test friction 	10.0 11.0 (pg. 355)	M M	C8.2 (pg. 363) C3.7 C3.3 (pg. 362) C1.5 (pg. 362)	T T
5	1	XXII. Power Brake System – Basic Operation				
		A. Identify and define booster parts <ol style="list-style-type: none"> 1. Diaphragm 2. Control valve 3. Check valve 4. Vacuum 	10.0 (pg. 355)	T	C8.2 (pg. 363) C1.5 (pg. 361)	T

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
15	5	XXIII. Brake System Inspection Procedures and Adjustment				
		A. Visually inspect <ol style="list-style-type: none"> 1. Fluid level and leaks 2. Lining condition 3. Springs and misc. hardware 4. Drum condition 5. Disc condition B. Mechanically inspect <ol style="list-style-type: none"> 1. Braking operation 2. Diagnosis 3. Outside factor C. Perform and test adjustments <ol style="list-style-type: none"> 1. Self adjusting 2. Manual adjusting 	10.5 11.0 (pg. 355)	T R	8.2 (pg. 363) 1.5 (pg. 361) 3.7 3.3 (pg. 362)	T
10	4	XXIV. Basic Parts Replacement Service				
		A. Perform replacement of <ol style="list-style-type: none"> 1. Shoes 2. Pads 3. Springs and hardware 4. Drum 5. Disc 	11.0 (pg. 355) 6.0 (pg. 354)	R T	8.2 (pg. 363) 1.5 (pg. 361) 3.7 3.3 (pg. 362)	T
12	3	XXV. Drum and Disc Machining				
		A. Drum <ol style="list-style-type: none"> 1. Demonstrate a set up 2. Perform machine operation 3. Evaluate machining B. Disc <ol style="list-style-type: none"> 1. Demonstrate a set up 2. Perform machine operation 3. Evaluate machining 	6.3 (pg. 354) 10.4 11.0 (pg. 355)	T T R	8.2 (pg. 363) 1.5 (pg. 361) 3.7 3.3 (pg. 362)	T T M

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
10	5	XXVI. Brake Preventative Maintenance				
		A. Perform a fluid replacement <ol style="list-style-type: none"> 1. Manual bleeding 2. Pressure bleeding B. Service <ol style="list-style-type: none"> 1. Define intervals 2. Discuss Awareness 	10.4 (pg. 355)	R	C1.5 (pg. 361) C3.3 C4.3 (pg. 362) C8.2	T M R
8	3	XXVII. Basic Measurements				
		A. Measure and convert units of measurement <ol style="list-style-type: none"> 1. Decimal 2. Metric B. Show use of measurement tools <ol style="list-style-type: none"> 1. Outside micrometer 2. Drum micrometer 3. Disc micrometer 4. Run out dial indicator 	1.3 (pg. 346)	T	C2.2 C2.3 C2.4 C2.5 C2.7 (pg. 361)	T T
8	3	XXVIII. Service Store Front				
		A. Operation <ol style="list-style-type: none"> 1. Identify costs 2. Estimate profits 3. Discuss labor 4. Rate Success/ failure B. Image <ol style="list-style-type: none"> 1. Appreciate station image 2. Describe workmanship C. Reputation <ol style="list-style-type: none"> 1. Indicate traits of a good reputation 2. Indicate traits of a bad reputation 3. Deduce cause and cures 	3.1 3.3 (pg. 353)	T M	5.1 ↓ 5.6 (pg. 362)	T/M
5	1	XXIX. Sales Techniques				
		A. Sales Techniques <ol style="list-style-type: none"> 1. Develop style 2. Define styles of approach 3. Define reasons for being knowledgeable and honesty 4. Practice reasoning 	3.1 (pg. 353)	T	5.1 ↓ 5.6 (pg. 362)	T/M

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
10	1	XXX. Job Costs and Charges				
		A. Calculating a Flat Rate <ol style="list-style-type: none"> 1. Estimate job hours 2. Estimate factory time 3. Estimate manual time 4. Determine addition time 5. Factor in legal requirements 6. Calculate charges 7. Figure a labor rate 	3.3 (pg. 353)	R	C5.3 (pg. 362)	T/M
5	1	XXXI. Repair Order				
		A. Prepare and order form – legal document <ol style="list-style-type: none"> 1. Date 2. Price estimate 3. Signature B. Note Labor instructions <ol style="list-style-type: none"> 1. Print legibly 2. Provide accurate labor description 3. Supply vehicle identification 	3.0 All (pg. 353)	T R	C5.3 (pg. 362)	M
5	1	XXXII. Parts & Price Books				
		A. Locate vehicle in catalog <ol style="list-style-type: none"> 1. Make 2. Model 3. Year 4. Miscellaneous B. Read and interpret catalog information <ol style="list-style-type: none"> 1. Price 2. Net 3. List 4. Discounts 	4.2 (pg. 353)	T	C5.6 (pg. 362)	T
			4.3 (pg. 353)	T		

Career Technical Skills						
Class Hours	CC/CVE Hours	CONTENT AREA SKILLS	Foundation Standards	Mention - M Reinforced - R Taught - T	CTE Pathway Standards	Mention - M Reinforced - R Taught - T
10	5	XXXIII. Basic record keeping				
		<ul style="list-style-type: none"> A. Monitor and account for inventory <ul style="list-style-type: none"> 1. Parts in stock 2. Parts on order 3. Special order B. Handle and record transactions <ul style="list-style-type: none"> 1. Cash 2. Checks 3. Credit cards C. Maintain records <ul style="list-style-type: none"> 1. Write-up repair orders 2. Issue receipts 	4.2 (pg. 353)	T	C5.3 (pg. 362)	M
200	100	Total Hours				

C. Expected Student Proficiencies**ATTITUDE AND WORK HABITS**

- Works both independently and collaboratively
- Attends regularly and on time
- Practices good safety procedures
- Solves problems, thinks critically and makes good decisions
- Plans work and takes initiative
- Demonstrates leadership and the willingness to help train others

PRINCIPALS OF SUSPENSION

- Identify suspension construction/frames
- Identify suspension types and functions
- Replace minor Suspension Components

STEERING SYSTEMS

- Identify and compare steering constructions and types
- Inspect steering components

TIRES AND WHEELS

- Examine the design and construction of tires and wheels
- Conduct a tire servicing and repair
- Balancing

BRAKE SYSTEMS

- Identify and evaluate drum brake system components and disc brake system components
- Explain the operation of each
- Visually and manually inspect brake system
- Understand preventative maintenance procedures

BASIC MEASUREMENTS

- Measure and convert units of measurement
- Use of measurement tools

SERVICE STORE FRONT

- Understand operation and sales techniques
- Estimate job Costs and charges
- Use repair order forms, parts & price books
- Understand basic record keeping

10. ADDITIONAL RECOMMENDED/OPTIONAL ITEMS

A. **Academic credit:** 5-20 units

B. **Other**

X	ARTICULATION	De Anza Community College
	UC APPROVAL	None
	INDUSTRY CERTIFICATION	None

C. **Instructional Strategies:**

- | | |
|--|---|
| <ul style="list-style-type: none"> • Lecture • Demonstration • Design problems and vocabulary • Critical comparison • Readings • Project-based learning • Work-based learning | <ul style="list-style-type: none"> • Guest presentations • Group projects • Computer programs • Field trips • Videos • Internet research • Peer learning |
|--|---|

Instructional Materials: The majority of classroom materials are provided for Automotive Mechanics ROP Students. In addition, there will be use of several different supplementary items to aid instruction. These will include, but are not limited to:

- Articles from various automotive publications
- Video clips from various automotive television programs
- Motion Pictures with automotive significance
- Photographs of custom, classic, and practical automobiles
- Tim Giles textbook ‘Modern Automotive Technology’ and associated powerpoint presentations
- Note sheets and instructor created vocabulary forms
- Shop equipment
- Hand tools, power tools, computerized diagnostic equipment

11. FOUNDATION (ACADEMIC) STANDARDS ALIGNED	* CAHSEE Test Item
1.0 Academics	
Students understand the academic content required for entry into postsecondary education and employment in the Engineering and Design sector. <i>(The standards listed below retain in parentheses the numbering as specified in the mathematics, science, history–social science, and visual and performing arts content standards adopted by the State Board of Education.)</i>	
Math	
* (1.1) Compare weights, capacities, geometric measures, times and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic centimeters).	
Science	
(3.a) Students know heat flow and work are two forms of energy transfer between systems.	
History/Social Science	
(5.5) Students analyze the major political, social, economic, technological and cultural developments of the 1920's.	
2.0 Communications	
Students understand the principles of effective oral, written, and multimedia communication in a variety of formats and contexts. <i>(The standards listed below retain in parentheses the numbering as specified in the English–language arts content standards adopted by the State Board of Education.)</i>	
Reading	
(2.3) Verify and clarify facts presented in other types of expository texts by using a variety of consumer, workplace, and public documents.	
Writing	
(1.3) Use clear research questions and suitable research methods (e.g., library, electronic media, personal interview) to elicit and present evidence from primary and secondary sources.	
Written & Oral English Language Conventions	
(1.4) Produce legible work that shows accurate spelling and correct use of the conventions of punctuation and capitalization.	
Listening & Speaking	
(1.6) Use appropriate grammar, word choice, enunciation and pace during formal presentations.	
Multimedia	
(a.) Combine text, images, sound and draw information from many sources (e.g., television broadcasts, videos, films, newspapers, magazines, CD-ROMs, the Internet, electronic media-generated images).	
3.0 CAREER PLANNING & MANAGEMENT	
Students understand how to make effective decisions, use career information, and manage personal career plans:	
3.1 Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers.	
3.2 Understand the scope of career opportunities and know the requirements for education, training, and licensure.	
3.3 Develop a career plan that is designed to reflect career interests, pathways, and postsecondary options.	
3.4 Understand the role and function of professional organizations, industry associations, and organized labor in a productive society.	
3.5 Understand the past, present, and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning.	
3.6 Know important strategies for self-promotion in the hiring process, such as job applications, résumé writing, interviewing skills, and preparation of a portfolio.	
4.0 TECHNOLOGY	
Students know how to use contemporary and emerging technological resources in diverse and changing personal, community, and workplace environments:	
4.1 Understand past, present, and future technological advances as they relate to a chosen pathway.	
4.2 Understand the use of technological resources to gain access to, manipulate, and produce information, products, and services.	
4.3 Understand the influence of current and emerging technology on selected segments of the economy.	
4.4 Understand the role and function of tools, equipment, and machines in the latest technology.	
4.5 Know important aspects of the current economy and labor market, including the type of goods and services produced, the type of skills workers need, the effects of rapid technological change, and the impact of international	

competition.

5.0 PROBLEM SOLVING & CRITICAL THINKING

Students understand how to create alternative solutions by using critical and creative thinking skills, such as logical reasoning, analytical thinking, and problem-solving techniques:

- 5.1 Apply appropriate problem-solving strategies and critical thinking skills to work-related issues and tasks.
- 5.2 Understand the systematic problem-solving models that incorporate input, process, outcome, and feedback components.
- 5.3 Use critical thinking skills to make informed decisions and solve problems.
- 5.4 Apply troubleshooting strategies, including failure analysis procedures, to issues as they arise.
- 5.5 Understand and demonstrate the ability to plan and solve problems in a systematic manner and apply the learned skills to real-world situations.

6.0 HEALTH & SAFETY

Students understand health and safety policies, procedures, regulations, and practices, including the use of equipment and handling of hazardous materials:

- 6.1 Know the policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities.
- 6.2 Understand critical elements for health and safety practices related to storing, cleaning, and maintaining tools, equipment, and supplies.
- 6.3 Use tools, equipment, and machinery safely and appropriately.
- 6.4 Know the local, state, and federal laws, and the requirements of regulatory agencies, that affect the transportation industry.

7.0 RESPONSIBILITY & FLEXIBILITY

Students know the behaviors associated with the demonstration of responsibility and flexibility in personal, workplace, and community settings:

- 7.1 Understand the qualities and behaviors that constitute a positive and professional work demeanor.
- 7.2 Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.
- 7.3 Understand the need to adapt to varied roles and responsibilities.
- 7.4 Understand that individual actions can affect the larger community.

8.0 ETHICS & LEGAL RESPONSIBILITY

Students understand professional, ethical, and legal behavior consistent with applicable laws, regulations, and organizational norms:

- 8.1 Know the major local, district, state, and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations.
- 8.2 Understand the concept and application of ethical and legal behavior consistent with workplace standards.
- 8.3 Understand the role of personal integrity and ethical behavior in the workplace.

9.0 LEADERSHIP & TEAMWORK

Students understand effective leadership styles, key concepts of group dynamics, team and individual decision making, the benefits of workforce diversity, and conflict resolution:

- 9.1 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace settings.
- 9.2 Understand the ways in which preprofessional associations, such as SkillsUSA, and competitive career development activities enhance academic skills, promote career choices, and contribute to employability.
- 9.3 Understand how to organize and structure work individually and in teams for effective performance and the attainment of goals.
- 9.4 Know multiple approaches to conflict resolution and their appropriateness for a variety of situations in the workplace.
- 9.5 Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others.
- 9.6 Participate as a member of a team and contribute to a group effort.

10.0 TECHNICAL KNOWLEDGE & SKILLS

- 10.1 Understand how to use and maintain transportation technological products and systems.
- 10.2 Understand the applications of transportation technology in relation to land, water, and air/space.
- 10.3 Understand the resources used to transport people and goods.
- 10.4 Understand various systems and processes related to transportation.
- 10.5 Operate, maintain, and troubleshoot equipment.

- 10.6 Understand how to acquire, store, and use materials and to allocate space efficiently.
- 10.7 Understand how to select and use information and communication technologies.
- 10.8 Understand the need to participate in sector-related professional improvement activities, SkillsUSA, other career technical education and skills associations, and professional improvement activities related to career pathway specializations.
- 10.9 Understand the need to obtain and maintain industry-standard, technical certifications significant to an industry sector.

11.0 DEMONSTRATION & APPLICATION

Students demonstrate and apply the concepts contained in the foundation and pathway standards.

11. C. Vehicle Maintenance, Service, and Repair Pathway Standards

The Vehicle Maintenance, Service, and Repair Pathway prepares students for postsecondary education and employment in the transportation industry, which includes, but is not limited to, motor vehicles, rail systems, marine applications, and outdoor power equipment.

C1.0 *Students understand the value and necessity of practicing personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards:*

- C1.2 Practice the safe handling and storage of chemicals and hazardous wastes in accordance with material safety data sheets and the requirements of local, state, and federal regulatory agencies.
- C1.5 Use appropriate personal protective equipment and safety practices.

C2.0 *Students understand the safe and appropriate use of tools, equipment, and work processes:*

- C2.1 Understand and use appropriate tools and equipment, such as wrenches, sockets, and pliers, to maintain and repair systems and components.
- C2.2 Use tools, equipment, and machines to safely measure, test, diagnose, and analyze components and systems (e.g., electrical and electronic circuits, alternating and direct-current applications, fluid/hydraulic and air/pneumatic systems).
- C2.3 Select and use the appropriate measurement device(s) and use mathematical functions necessary to perform required fabrication, maintenance, and operation procedures.
- C2.4 Know and understand the elements of precision measuring using standard and metric systems.
- C2.5 Use measurement scales, devices, and systems, such as dial indicators, and micrometers to design, fabricate, diagnose, maintain, and repair vehicles and components following appropriate industry standards.
- C2.6 Know and understand how to access technical reports, manuals, electronic retrieval systems, and related technical data resources.
- C2.7 Comprehend the importance of calibration processes, systems, and techniques using various measurement and testing devices.

C3.0 *Students understand scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems:*

- C3.3 Understand the basic principles of pneumatic and hydraulic power and their applications.
- C3.5 Understand the basic principles of electricity, electronics and electrical power generation, and distribution systems.
- C3.7 Perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and malfunctions.

C4.0 *Students perform and document maintenance procedures in accordance with the recommendations of the manufacturer:*

- C4.3 Use reference books, technical service bulletins, and other documents and materials related to the automotive service industry available in print and through electronic retrieval systems to accurately diagnose and repair vehicles.

C5.0 *Students understand and apply appropriate business practices:*

- C5.1 Understand work-related systems common to the transportation service industry.
- C5.2 Know the laws and regulations applicable to recordkeeping and the appropriate handling and disposal of hazardous materials.
- C5.3 Understand the importance of and the procedures for maintaining accurate records (e.g., business licenses, repair orders, billing and tax records).
- C5.4 Understand the concept and application of accepted ethical business practices.
- C5.5 Understand the concept and application of acceptable customer relations practices.
- C5.6 Understand the need for maintenance of components and systems and the conditions under which service and maintenance are required.

LEGEND FOR REFERENCE OF ACADEMIC STANDARDS

Parenthetical notation preceding the content standard item refers to the grade level for the standard. i.e. (8) refers to grade 8, (9-10) refers to grades 9 & 10.

Example: (8) W2.1 refers to the Eighth Grade Writing Standard Item 2.1

English-Language Arts:

R Reading
W Writing
WOC Written & Oral Conventions
LS Listening & Speaking

CRP: Connections, Relationships,
Proficient

CRA: Connections, Relationships,
Advanced

Mathematics:

NS Number Sense
AF Algebra & Functions
SDP Statistics, Data Analysis & Probability
MR Mathematical Reasoning
MG Measurement & Geometry
AI Algebra I
G Geometry
AII Algebra II
P&S Probability & Statistics
APP&S Advanced Placement Probability &
Statistics
C Calculus

ELA: English-Language Arts with in VPA

ELA- LRA: Literary Response and Analysis

ELA-WSA: Writing Strategies &
Applications

ELA-WOELC: Written & Oral English
Language Conventions

Sectors

AME Arts, Media and Entertainment
BTC Building Trades and Construction
ECDFS Education, Child Development &
Family Services
EU Energy & Utilities
ED Engineering & Design
FID Fashion and Interior Design
FAB Finance and Business
HSMT Health Science & Medical Technology
HTR Hospitality, Tourism & Recreation
IT Information Technology
MPD Manufacturing and Product
Development
MSS Marketing, Sales, & Services
PS Public Services
T Transportation

Science:

PH Physics
CH Chemistry
ES Earth Science
I&E Investigation and Experimentation

History-Social Science:

WH World History, Culture and Geography
USH United States History and Geography
AD American Democracy
ECON Economics

Visual and Performing Arts:

APP: Artistic Perception Proficient Level
APA: Artistic Perception Advanced
CEP: Creative Expression Proficient
CEA: Creative Expression Advanced
HCCP: Historical & Cultural Proficient
HCCA: Historical & Cultural Advanced
AVP: Aesthetic Valuing Proficient
AVA: Aesthetic Valuing Advanced