

UNIVERSITY OF HAWAII COMMUNITY COLLEGES

ANNUAL INSTRUCTIONAL PROGRAM REVIEW PROCEDURES, COMPONENTS, AND MEASURES

I. PROCEDURES

The following procedures have been developed to assure more consistent data collection practices in the compilation, analysis, and reporting of the minimum measures, and to use the Annual Instructional Program Review in the college and UHCC budget development processes:

- 1 The Quantitative Measures will use data from UH system sources such as the Operational Data Store (ODS), Management And Planning Support (MAPS), and system designated occupational outlook sources;
- 2 The Office of the Vice President for Community Colleges (OVPCC) shall by August 15th compile and distribute data to the colleges for the system required minimum set of Quantitative Measures;
- 3 The data used shall come from the fall semester of the prior academic year, except for the Program Budget Allocation, Graduation/Completion, Transfers, and Perkins Core Indicators which will be based on prior year annual end-of-academic-year reports. Quantitative measures for the two prior academic years shall be included with the Annual Instructional Program Review (total of three years of data) and;
- 4 Colleges will complete the Annual Instructional Program review by the end of the fall semester;
- 5 Completed Annual Instructional Program Reviews shall be posted on the college web site; and
- 6 Colleges will submit an electronic file to the Office of the OVPCC by December 15th, in the form and format requested by the Associate Vice President for Academic Affairs.

II. COMPONENTS AND MEASURES

At a minimum, each college Annual Instructional Program Review shall consist of the following components and measures. Colleges are free to use additional components and measures for their internal assessment process.

AUTO BODY REPAIR and PAINTING
(Program Name)

Introduction:**Program Mission Statement and brief description of the program including a listing of program level student learning outcomes.**

Maui Community College has designated its self as a learning-centered institution and Auto Body Repair and Painting Program (ABRP Program) aligns itself with the concepts of a learning-centered program and also has incorporated the concept of a lifelong learner into the program curriculum.

Offering the ABRP Program in a self-paced module format fulfills three areas of learning. First, the self-paced module format allows for the needs of students striving to obtain gainful employment in the trade to be met. Next, for students looking to improve their skills in specific areas of the trade are satisfied, and finally students enrolled for self- knowledge also have their needs fulfilled. Instruction in the ABRP Program for all three types of students can be accomplished at the same time.

The ABRP Program also in agreement with the open admissions policy of the Maui Community College campus, allowing students to enter in to the program in either semester and have the opportunity to specialize in two distinctive areas of the trade once the core subjects for the ABRP Program are mastered, as well as to improve their levels of knowledge and skills demanded by the auto collision repair and auto refinish repair aspects of the trade.

The ABRP Program strives to provide instruction in the most current repair and refinish technology available to all students. There are two avenues available for individuals, either as full-time or part-time students to receive instruction in the ABRP Program, with the ultimate goal of receiving either their Associate in Applied Science Degree (AAS) or a Certificate of Achievement Degree (CA).

First, students can actively pursue a degree or a certificate as fulltime students. Upon completion all students exiting the program with an AAS Degree or a CA Degree should be able to satisfactorily perform their expected and required tasks at entry level or higher in the Auto Body and Refinishing trade.

Second is, this program also provides for individuals who are currently employed in the Automotive Collision and Corrosion Repair or Automotive Refinishing industry a way to attend MCC as part-time students. The ABRP Program is able to present these students with in-service training as Auto Collision Technicians, Auto Corrosion Technicians, and Auto Refinishing Technicians, because of the self-paced modules. This in-service training allows the technician to use the MCC ABRP Program in several ways. One, this program can be utilized as a refresher course, allowing the technician to be able to perform their daily work assignments more efficiently. Next, technicians can enroll in the Auto Body Repair and Painting Program for advancement in their specialized area of the trade. Another is to cross train into another field of the industry, such as a collision technician return to learn about complete or touch up refinishing procedures.

Part I. Quantitative Indicators for Program Review Demand

Occupational Demand (Career Technical Education Programs)

1. Annual new and replacement positions in the State

During the past five years the Auto Collision repair and refinishing trade has grown faster here on Maui as compared to the rest of the outer islands in the state due to the increase of population on Maui and to the number of visitors arriving here.

2. Annual new and replacement positions in the County

As noted from above, the Auto Collision and refinishing trade is growing at a rapid rate here on Maui. Statistics show an increase in the number of collision repair facilities has grown over the last five years from 3 to 5 large shops, to almost 8 to 10 large shops and from 10 to 17 or 20 smaller shops. This was reported to me by a member of our ABRP Advisory Committee (who works for a major insurance company here on Maui) recently during our conversation about the demands and needs of the industry.

3. Number of majors

The number of majors has been a weak point for the program as many of the students enrolled in the past several years were part-time students already working in the trade or a related trade and attending classes to improve their knowledge and skills. In my conversations with these students, they felt that they should not declare themselves as majors in the program as they believed it would require a commitment from them to enroll and complete all the required courses for a degree seeking student to remain in the program, not just the ABRP Program offerings. Most full-time students usually declare themselves as majors in the program as they are working towards receiving their certificates and degrees from the program.

4. Student semester hours for program majors in all program classes

There are students in the program, but as noted above many students choose to register themselves as majors in the program.

5. Student semester hours for non-program majors in all program classes

6. Student Semester Hours for all program classes.

7. FTE program enrollment

The FTE program enrollment numbers are low because there are many part-time students in the program. Some are attending for in-service training, enrolling in only certain courses; while others are working towards degrees enroll in certain ABRP classes as to concentrate on getting their other degree requirements done first. These students usually take six to eight semesters to complete the program.

8. Number of classes taught

The number of classes taught in the ABRP program is measured not by the individual course listings, but by the time periods for each class session. Students enroll in a module and for a specific time.

9. Determination of program's health based on demand (Healthy, Cautionary, or Unhealthy)

Cautionary

Efficiency

10. Average class size

The ABRP usually has 70% to 100% filled classes during the five time sessions offered each semester. There have been times when a class session average for a semester may be down to 10 students, but usually a majority of these students in a low enrolled class are program majors and are also registered in other time sessions. The average numbers of students for each class session is about 14 students.

11. Class fill rate

The ABRP Program for the past 5 years has been usually filled at about 90% average capacity or better. I have noticed that usually when unemployment is low my student head count is low and when unemployment is high my student head count rises.

12. FTE of BOR appointed program faculty

The ABRP Program has one full-time faculty.

13. Student/Faculty Ratio

14. Number of Majors per FTE faculty

The number of majors per FTE faculty is low due to the number of students that have decided not to or do not care about declaring the ABRP Program as a major.

15. Program Budget Allocation (Personnel, supplies and services, equipment)

16. Cost per Student Semester Hour

17. Number of classes that enroll less than ten students

None

18. Determination of program's health based on Efficiency (Healthy, Cautionary, or Unhealthy)

Healthy

Effectiveness

19. Persistence of majors fall to spring

The persistence of majors from the fall semester into the spring semester was at 50% or better, but slipped during the 2006-07 academic year as the demand from industry required more employees and the students deciding to work full-time. Not only were majors lost, but also non-majors. The students that were working part-time were encouraged by their employers to work full-time hours because of the amount of work available. I was able to talk to several of the students from the previous four semesters about returning to school and all but one said that they planned to return as part-time students with the intent on earning a degree. I recently have also talked to their employers about encouraging the students to return to school and discussion with them seemed to be fruitful and hopefully these students will return to the program and ultimately receive their degrees.

20. Number of degrees and certificates earned (annual)

A number of the ABRP students enrolled in the program are not seeking a degree in the program. They are here for in-service training and only enroll in classes that they need for advancement. Others seek employment after they gain enough knowledge and skills of the auto body trade and never return to the program. When I visit the shops, I always see former non-completers from the ABRP still employed.

21. Number of students transferred (enrolled) to a four-year institution

There were no transfers to a four-year institution that I am aware of in the last five years.

Perkins core indicators (*Career Technical Education programs only)

22. Academic Attainment (1P1)

By the definitions that I could find for 1P1, this would include the students that became employed while in the program on a part-time basis. These students then became full-time employees for the respective companies that they are working for.

23. Technical Skill Attainment (1P2) *

All students are required to attain a certain level of competency for the technical skills necessary to complete assigned tasks in the program. These technical skills correlate to the skills a person would need to be gainfully employed in the trade as a body repair technician or a refinish technician.

24. Completion Rate (2P1)

The completion rate of both majors and non-major students are low because they were either already employed or become employed while enrolled in the ABRP Program. Because of this the students chose to concentrate on their employment first, then school. There are students that have changed from full-time student to part-time status and are still enrolled in the program.

25. Placement in Employment, Education, and Military (3P1)

Due to the demand for auto collision and auto refinishing technicians here in the Maui County, almost all of the students are able to find employment either while still in school or as soon as they graduate from the program.

26. Retention in Employment (3P2)

The students, receiving degrees or not once employed remain employed until they decided to leave the trade. The majority of the ABRP Program former students are still in the trade as employees and now some have their own repair facilities and hire students from the ABRP Program.

27. Non Traditional Participation (4P1) *

There have been several non-traditional participants enrolled in the program during the past 5 years.

28. Non Traditional Completion (4P2) *

Many of the non-traditional participants attendance becomes sporadic and do not complete the courses they enrolled in once they begin to do the practical exercises in the shop. In discussion with these participants, their responses was that they did not realize how hard it would be to be able to weld and work on the automotive sheet metal, or to complete refinish a vehicle.

29. Determination of program's health based on effectiveness (Healthy, Cautionary, Unhealthy)

Cautionary

Part II. Analysis of the Program

Strengths and weaknesses in terms of demand, efficiency, and effectiveness based on an analysis of data.

The strength of the program is in the demand by industry for skilled and semi-skilled employees. We constantly receive requests for students for employment. A weakness, in my observation, is to retain the students until they at least receive a degree from the program.

Significant Program Actions (new certificates, stop-out; gain/loss of positions, results of prior year's action plan)

The implementation of IICAR curriculum into the ABRP Program was completed in the 2006-2007 academic year. IICAR is an acronym for Inter-Industry Conference on Auto Collision Repair. They are a non-profit organization that works hand in hand with auto manufacturers, equipment manufactures, and product manufacturers to provide the latest information and training on collision and corrosion repairs, as well as refinishing procedures. NATEF/ASE use the IICAR training requirements as the standard for their ASE technician certification.

1. Determination of program's overall health (Healthy, Cautionary, Unhealthy)

Cautionary

Part III. Action plan-

At present the problem of retaining students is at the forefront as a major issue for the ABRP Program. I have been trying to produce a much more "user friendly format" for the module for the students. An effort to incorporate more computer skills related assignments, such as WEB CT instruction for certain subject areas related to auto body repair, students being able to take their test and quizzes on line is foremost as my next project for the program. I have already secured on-line information and training cds and dvds for the students.

I am also looking at the idea using a lecturer or student help to retain students in the program by being able to provide more support for the students while they are actively participating in laboratory and classroom activities.

Another interesting action I plan to pursue is having a contract between the ABRP Program, the student, and their employer to encourage the student to remain in school and receive a degree. This was suggested by an employer who has been trying to have former students from the ABRP Program and now employed by him, to return to school and graduate with a degree from the ABRP Program.

Part IV. Resource Implications (physical, human, financial)

No major equipment is required at this time. But small equipment, such mig welders and power tools will be needed. Another is funding for a lecturer or help to oversee and supervise the laboratory while the instructor is in the classroom working with students.

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Describe and discuss the historical and environmental implications of the auto body industry.	X		X	X	
Discuss the economic considerations of the auto body industry, including job opportunities, pay scales, unions, and the factors concerning job stability and security.	X		X	X	X
Describe the two-year Auto Body Program in terms of the: a. certificates of completion and achievement, b.associate degree, c. scope of curriculum	X		X	X	
Explain general shop safety practices and perform at that level.	X	X	X	X	X
Identify personal safety considerations: eye protection, proper clothing, shock hazards, dangerous fumes, etc. before beginning welding operation	X	X	X	X	X
Identify personnel health and safety hazards according to OSHA guidelines. Select proper spray mask; inspect the spray mask to insure proper fit and operation; inspect the condition of the mask filters and other components.	X	X	X	X	X
Explain the employee's responsibility to the employer and the employer's responsibility to the employee.	X			X	X
Discuss in general the various metals and plastics used in the auto body industry.	X	X	X	X	
Discuss types of vehicles and their construction	X				
Discuss design and nomenclature of auto bodies	X				
Discuss and demonstrate the use of shop manuals which will be encountered during the first year of training.	X		X	X	
Explain all fire and safety regulations pertaining to the use and storage of all paint, equipment, and materials. Explanation must include: a. type of fire extinguishers, b. storage of combustible materials, c. personnel safety, d. spray booth safety	X		X	X	
Explain all fire and safety regulations pertaining to the storage, handling, and disposal of hazardous waste materials. Identify and dispose of hazardous waste according to EPA regulations.	X		X	X	X
Explain the use of each tool in the auto body repair kit.Demonstrate the correct, safe use of the following:a. tap and die set, b. impact driver, c. pop rivet gun, d. caulking gun, e. hammer and dolly, f. reverse hammer, g. box and open end wrenches, h. pliers (all types), i. screw drivers, j. sockets and ratchets, k. body, conventional, and cheese grate files, l. body punches and chisels (include dress and sharpen)	X	X		X	X
Observe the safety precautions pertaining to the operation of all hand tools.	X	X	X	X	X
Observe all fire and safety regulations pertaining to the use of electrical cords, drop lights, tools, and compressed air hoses	X	X		X	X
Observe all safety rules pertaining to the operation of air tools.	X	X		X	X
Explain the method of rating air compressors.	X	X			

Explain the differences between a single and double stage compressor.	X				
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Explain and perform the daily and monthly maintenance of air compressors.	X				
Identify and explain the correct use of each of the following: a. air grinders, b. random orbital sander, c. finish sander (jitter bug), d. air board, e. impact wrench, f. panel cutter, g. blow guns (must include safety), h. air transformers.	X	X	X	X	X
Grind paint from the damaged area of a body panel. Use a body grinder to remove lacquer and enamel paint from at least two automobile panels. Also, remove the paint from two panels which have a reverse contour surfaces. Disc sand the repaired body panel to produce final smoothness.	X	X			X
Observe all safety precautions pertaining to the operation of hydraulic equipment.	X			X	X
Identify and demonstrate correct assembly procedures and use of the following: a. 4 ton port-a-power, b. 10 ton port-a-power, c. floor jacks, d. chassis jack, e. damage (pull) dozer, f. power post, g. floor hoist, h. bumper jack, i. press	X	X		X	X
Observe the proper safety rules as they apply to the use of mechanical pulling equipment.					
Identify, list the purposes, and demonstrate the use of the following mechanical pulling equipment: a. friction jacks, b. screw jacks, c. come-along	X				X
Observe all safety precautions pertaining to the operation of electric power tools.	X		X		X
Specify the uses and operating characteristics of the following electric drills: a. 1/4 inch, b. 3/8 inch, c. 1/2 inch.	X				
Use rotary files and carbon brushes for cleaning metal.		X	X	X	X
Demonstrate the basic safe drilling techniques used to attach or detach two pieces of sheet metal.	X				
Select and properly use the following materials: a. abrasives, b. adhesives, c. metal conditioners, d. sealers, e. fasteners.	X	X	X	X	X
Mix plastic filler and apply plastic filler. Cheese-grate during curing and rough sand cured plastic body filler to contour; finish sand.	X	X	X	X	X
Identify safety considerations: eye protection, proper clothing, shock hazards, dangerous fumes, etc. before beginning welding operation. List personal safety precautions that are applicable when oxyacetylene, MIG welding, plasma arc cutting, resistance panel arc welding, or TIG welding.	X	X	X		X
Protect computers and other electronic modules from possible welding damage. List the precautions to follow when using MIG welding on an automobile.	X		X	X	X
Identify weldable and non-weldable materials used in auto body components.		X			X
Discuss safety, equipment, and care of oxygen-acetylene welding equipment used in auto body repair.	X	X			

Explain and demonstrate the set-up and shut-down of oxyacetylene equipment and light the torch tip and adjust the tip flame to show: a. oxidizing flame., b. neutral flame, c. carburizing flame.	X	X		X	X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Safely demonstrate the proper procedures to use the cutting torch.		X			X
Perform the following steel welds using light gauge auto body sheet metal: a. run bead without rod, b. run bead with rod, c. butt weld, d. lap weld, e. tee weld, f. vee weld, g. tack weld, h. plug weld.		X			X
Demonstrate steel welding in the following positions: a. flat, b. vertical, c. horizontal, d. overhead.		X			
Weld a fender crack and a tear.		X			X
Cut the following with the oxyacetylene torch cutting tip: a. light gauge (20) mild steel (auto body metal), b. 1/4" mild steel plate.		X			
Perform the following braze welds using light gauge auto body sheet metal: a. run bead with rod, b. lap weld, c. tee weld, d. tack weld, c. plug weld.		X			
Demonstrate braze welding in the following positions: a. flat, b. vertical, c. horizontal, d. overhead.		X			
Repair rusted area with a large patch and restore original contour.					X
Explain the necessity for using the MIG welder to perform current auto body repairs.	X	X	X		
Determine correct electrode wire type, diameter, and gas to be used in specific welding situations. Explain the type of gas used and mixtures used with specific values. Identify the classification of the wire.	X	X	X		X
Identify safety considerations: eye protection, proper clothing, shock hazards, dangerous fumes, etc. before beginning welding operation. List personal safety precautions that are applicable when welding.	X	X			X
Demonstrate set-up and shut-down procedures for a MIG welding machine. Determine correct electrode stick out, amperage, and wire feed speed required for the weld. Set up the welder in accordance with the manufactures' instructions; clean the gun and gas nozzle as required. "Tune" the welder to the material being welded.		X			X
Using 24 gauge or thinner auto body sheet metal. Clean the metal to be welded; assure good metal fit through preparation and clamping. Weld the following: a. bead, b. tack and plug weld, c. lap, d. butt, e. vee, f. tee, g. fillet, h. stitch		X			X
Use the proper angle of the gun to the joint, and the direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions. Demonstrate bead or seam welding in the following positions: a. flat, b. vertical, c. horizontal, d. overhead.		X			X

Using 24 gauge or thinner sheet metal, repair an area with a large patch and restore to original contour without excessive warpage. Determine the correct joint type (butt, lap, etc.) for weld being made. Determine the correct type of weld (continuous, stitch/pulse, tack, plug, etc.) for each specific weld repair.	X	X	X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Identify cause(s) of spits and sputters, burn through, lack of penetration, cracks in metal, porosity, incomplete fusion, excessive spatter, distortion, and waviness of bead; make necessary adjustments.	X	X			X
Identify cause(s) of contact tip burn-back and failure of wire to feed; make necessary adjustments.		X			X
Describe the theory of operation of the thermal arc plasma cutter. List, identify, and discuss the functions on the control panel and torch body. Demonstrate in proper sequence the pre-operation se-up on the control panel and the shut-down of the panel.	X	X	X	X	X
List a minimum of four safety precautions that are observed to prevent possible injuries.	X	X		X	X
List the precautions to observe when using the torch on an automobile.		X		X	X
Demonstrate the correct use of the cutting operation using the torch.		X		X	X
Demonstrate cutting in the following positions using auto body sheet metals and conventional frame metals: a. flat, b. vertical, c. horizontal, d. overhead.		X			
Demonstrate plasma arc torch maintenance.		X		X	X
Identify three common cutting faults and all of the probable causes for each.		X		X	X
Discuss safety, equipment and care of resistance spot welder used in auto body repair. Demonstrate set-up and shut-down of resistance spot welder.		X		X	X
Discuss advantages and disadvantages of the resistance spot welder.	X	X	X	X	X
Demonstrate proper procedures of replacing a panel using the resistance spot welder.		X		X	X
Diagnose damaged areas and explain the sequence of repair. Determine the extent of the direct and indirect damage, the direction of impact, and plan the methods and order of repair.	X	X	X		X
Describe the physical changes that take place when sheet metal is formed or damaged. Description must refer to work hardening, heat, stretching, and shrinking.		X		X	X
Remove dirt, grease, and wax from those areas to be repaired. Remove dirt, corrosion protection, under coatings, sealers, and other protective coatings necessary to perform repairs to structural areas.	X	X	X		

Assessment of Intended Student Learning Competancies and COWIQ

	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Straighten roughed out contours of damaged panel to a surface condition for body filling or metal finishing using power and hand tools. A. Grind the paint from the damaged area of the body panel, B. Demonstrate the use of both pneumatic and electric portable disc grinders, C. Demonstrate the use of body hammers and dollies, D. Demonstrate the use of spoons and pry bars, E. Demonstrate the procedures of using heat in the shrinking of metal, F. Weld cracked or torn steel body panels; reweld broken welds, G. Heat shrink stretched panel areas back to contour, H. Cold shrink stretched panel areas back to contour, I. Restore contour with heat, J. Pick and file the damaged are of a body panel to eliminate surface irregularities, K. Disc sand the repaired body panel to produce final smoothness, L. Demonstrate surface preparation procedures for applying body filler.			X		X
Describe the physical changes that take place when sheet metal is formed or damaged. Description must refer to work hardening, heat, stretching, and shrinking.		X		X	X
Describe how car bodies have changed in the last several years in terms of weight, materials, construction and longevity. Discuss issues related to corrosion protection structural integrity. Differentiate between the effects of corrosion on unibody vs. conventional frame type of cars.	X			X	
Describe how original equipment manufacturers prevent corrosion and enhance the longevity of auto body components and finishes.	X		X	X	
Identify the equipment components and procedures required to apply anti-corrosion compounds.			X		
Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas. Reapply the undercoat, or other sound deadener, from the underside of damaged sheet metal.	X				
Properly mix plastic and catalysts taking into consideration the effects of temperature. Mix plastic body filler. Demonstrate techniques of applying plastic fillers. Apply plastic body filler and cheese-grate during curing. Rough sand cured plastic filler to contour; finish sand.			X		X
Demonstrate finishing techniques on flat panels, low crown, medium crown, high crown, style lines, and reverse contours using plastic filler. Demonstrate procedures used in repairing panels which have been previously repaired with plastic filler.		X	X		X
Describe the process of using body solder.					
Explain and demonstrate basic alignment procedures of auto sheet metal. Demonstrate removal and installation of parts and trim according to job description.					
Explain the differences between air compressors and how they are used.	X				
Explain the construction and purpose of the air transformer.	X				

Explain how the diameter and length of a hose influence air pressure.	X				
Assessment of Intended Student Learning Competencies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Describe the differences between a pressure-type spray gun, a siphon-type spray gun, and a gravity-type spray gun.	X		X	X	X
Disassemble and assemble selected spray guns.		X	X		X
Identify and explain the purpose of each part of a spray gun.			X	X	X
Identify spray models and their specific uses.			X	X	X
Describe the materials and method used in cleaning spray guns.	X			X	X
Demonstrate cleaning and adjustment procedures for spray guns.	X				X
Demonstrate lubrication of the spray gun.	X				X
Check and adjust air pressure on the spray gun (includes siphon-feed, pressure-feed, and gravity-feed).		X			X
Adjust spray gun using fluid and pattern control valves.					X
Check and adjust high volume, low pressure spraying equipment.					X
Explain and demonstrate the various gun techniques needed for the proper application of primers, enamels, and lacquers.	X			X	X
Explain the problems of improper application techniques.				X	X
Select proper air pressure and spraying technique (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for finish being applied.		X			X
Inspect, clean, and determine condition and adequacy of spray guns and related equipment (air hose, regulator, air lines, and compressor).					X
Describe the parts of a paint booth and how it works. Explain and demonstrate the preparation of a spray booth.	X		X	X	X
Inspect air make-up and exhaust systems (including intake filters, exhaust filters, fan and other mechanical components of the system; insure proper filtering and ventilation.					X
Explain the painting process. Explanation must refer to air pressure, reduction of paint, atomization, evaporation, and shrinkage.		X		X	X
Describe and demonstrate the following application techniques. Also, explain how all these application techniques interrelate to obtain color match. Explain the problems of improper application techniques: a. gun distance, b. angle, c. speed, d. reduction, e. gun adjustments, f. air pressure.				X	X
Inspect and identify type of finish and surface condition; develop a plan for refinishing. Determine type and color of paint on vehicle.			X		X
Identify paint cracking (crowsfeet or line-checking, micro-checking, etc.); correct the condition	X				X

Identify poor adhesion; determine the cause(s), and correct the condition.	X				X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Identify blistering (raising of the paint surface); determine the cause(s), and correct the condition.	X				X
Check for rust spots on the surface; determine the cause(s), and correct the condition.	X				X
Identify water spotting on paint surface; correct the condition.	X				X
Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	X				X
Identify finish damage causes by airborne contaminants, (acids, soot, and other industrial-related causes); correct the condition.	X				X
Identify die-back conditions (dulling of the paint film showing haziness and/or film distortion showing shrinking; correct the condition.	X				X
Identify chalking (oxidation); correct the condition.	X				X
Identify surface preparation equipment and explain its uses. Demonstrate surface preparation techniques.	X				X
Remove dirt, wax, road grime, and special coatings from area to be refinished and from adjacent surfaces; wash entire vehicle.	X				X
List surface preparation abrasives and their uses. Dry and wet sand areas to be refinished. Featheredge broken areas to be refinished.	X		X		X
Chemically and mechanically remove paint finish where necessary.	X		X		X
Identify type of metal and apply suitable metal treatments.	X		X		X
Explain the differences and similarities between "primer", "primer-surfacers", and "sealers". State when each is to be used.	X			X	X
Mix primer, primer-surfacer, or primer sealer; spray onto surface of repaired area according to parts manufacturers' specifications.	X	X	X		X
Explain the basic difference between lacquer and enamel undercoats including consideration of: a. drying time, b. adhesion, c. dust problems, d. shrinkage, e. reduction.	X		X	X	X
Explain the following characteristics of lacquer undercoats: a. drying time, b. adhesion, c. dust problems, d. shrinkage, e. reduction.					
Explain the following characteristics of enamel undercoats: a. drying time, b. adhesion, c. dust problems, d. shrinkage, e. reduction.	X		X	X	X
Dry or wet sand areas to which primer-surfacer has been applied.					X
Demonstrate the use of a polisher. Compound or prepare around the edge of the repaired area to be refinished.					X

Apply recommended sealer to the area being refinished according to manufacturers' specifications. Scuff sand to remove nibs or overspray from a sealer.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Apply adhesion promoter over areas to be painted, where applicable; blend into adjacent area.	X	X			X
Convert weight to volume. Identify the relationship between pints, quarts, and gallons.	X	X	X		X
List the reduction ratio of the following materials: a. synthetic enamel, b. acrylic lacquer, c. acrylic enamel, d. urethane enamels.	X	X	X		X
Define basic paint terms. Explain and demonstrate the use of paints, additives, solvents, abrasives, and compounds.	X		X	X	X
Shake, stir thin or reduce, and strain paint according to manufacturers' recommendations. Apply selected product on test panel in accordance with manufacturers' recommendations.	X	X	X		X
Demonstrate surface preparation for acrylic enamel. Prepare acrylic enamel refinishing materials for application with consideration of "shop conditions" (temperature, humidity, ventilation) and existing surface conditions of the vehicle. Apply acrylic enamel for spot and panel blending, and overall refinishing. Select and perform sanding, buffing, and polishing processes for acrylic enamel finish.	X	X	X		X
Perform surface preparation for polyurethane enamel. Prepare polyurethane enamel refinishing materials for application with consideration of "shop conditions" (temperature, humidity, ventilation) and existing surface conditions of the vehicle. Apply urethane enamel for spot and panel blending, and overall refinishing. Select and perform sanding, buffing, and polishing processes for polyurethane enamel finish.	X	X	X		X
Perform surface preparation for painting lacquer. Prepare acrylic lacquer refinishing materials for application with consideration of "shop conditions" (temperature, humidity, ventilation) and existing surface conditions of the vehicle. Apply acrylic lacquer for spot and panel blending, and overall refinishing. Select and perform sanding, buffing, and polishing processes for acrylic enamel finish.	X	X	X		X
Apply acrylic lacquer base-coat/clear-coat for spot and panel blending, and overall refinishing.	X	X	X		X
Apply urethane enamel base-coat/clear-coat for spot and panel blending, and overall refinishing.	X	X	X		X
Prepare materials and apply three-stage paint system.	X	X	X		X
Check for color matching of all applied finishes.	X	X	X		X

Blow dust from entire vehicle including cracks and moldings in the area to be refinished. Clean area to be refinished with proper solvent.					X
Remove, with a tack rag, any dust or lint particles from the area to be refinished.					X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Identify and explain the use of all materials needed for the masking operation. Prepare the surface for masking. Demonstrate masking of molding, ornaments, windows, etc... Demonstrate masking techniques for a two-tone paint job.	X				X
Remove and store trim and molding. Mask trim and other areas that will not be refinished.	X				X
Describe and explain the causes, prevention, and correction techniques of the following: a. adhesion loss, b. cracking, c. featheredge cracking, d. water spotting, e. solvent popping, f. wrinkling of enamel	X			X	X
Identify blushing (milky or dull mist formation); determine the cause(s), and correct the condition.	X				X
Check for dirt in the painted surface; identify the source(s), and correct the condition.	X				X
Identify a dry spray pattern in the paint surface; determine the cause(s), and correct the condition.	X		X		X
Identify the appearance of fish-eyes (crater like openings) in the finish after it has been applied; determine the cause(s), and correct the condition.	X		X		X
Identify lifting (surface distortion or shriveling); determine the cause(s), and correct the condition.	X		X		X
Identify streaking in paint finishes; determine the cause(s), and correct the condition.	X		X		X
Identify orange peel appearance; determine the cause(s), and correct the condition.	X		X		X
Identify an overspray condition; determine the cause(s), and correct the condition.	X		X		X
Identify sags and runs in the paint surface; determine the cause(s), and correct the condition.	X		X		X
Identify sandscratch swelling; determine the cause(s) and correct the condition.	X		X		X
Identify shrinking and splitting while finish is drying around repaired area; determine the cause(s), and correct the condition.	X		X		X
Identify that color is off-shade or does not match; determine the cause(s), and correct the condition.	X		X		X
Identify pin-holing (solvent popping) and blistering appearance in the paint surface; determine the cause(s), and correct the condition.	X				X
Identify body-filler bleed-through or pin-holing; correct the condition.	X				X

Identify tape tracking; determine the cause(s), and correct the condition.	X				X
Identify bleed-through; determine the cause(s), and correct the condition.	X				X
Apply stone chip-resistant coating to lower body areas.	X				X
Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas.	X	X	X		X
Select and perform sanding, buffing, and polishing processes for finish.					X

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Identify buffing-wheel burns on a painted surface; determine the cause(s), and correct the condition.			X		X
Identify the types of rigid and flexible plastic parts to be finished; determine correct materials and refinishing procedures. Apply finish coat to rigid and flexible plastic parts.	X		X		X
Clean, condition, and refinish vinyl (e.g., upholster, dashes, and tops).					X
Clean and detail vehicle after complete refinishing. Demonstrate detailing methods on the following: a. weather-stripping and other rubber surfaces, b. glass, c. wheel house, d. chrome, e. tires and wheels, f. instrument panel, g. perform check of running lights.					X
Demonstrate the correct procedure for cleaning each of the major kinds of auto fabrics.	X		X		X
Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc..					X
Remove damaged or necessary exterior trim and moldings. Remove and replace the following: a. rocker molding, b. side molding, c. belt molding, d. peak molding, e. drip rail scalp molding.					X
State type of molding and ornament installation appropriate to the year and make of car. Install the following accessories: a. remote control mirrors, b. side view mirrors, c. radio antenna, d. bumper and grille guards, e. door edge moldings (OEM and non-OEM)					X
Demonstrate the removal and replacement of seats and seat tracks, both manual and electric.	X		X		X
Demonstrate how to remove and replace a headliner.					X
Describe how to replace a padded instrument panel.				X	X
Remove damaged, non-structural body panels and components that may interfere with or be damaged during repair.	X		X		X
Overhaul front and rear bumper assemblies.			X		X
Install woodgrain transfer and striping kits.	X		X		X
Demonstrate how to remove, replace and repair a vinyl top.					X

Remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair.	X		X		X
Remove repairable plastics and other parts that are recommended for off-car repair.	X		X		X
Repair or replace all power-driven accessories and related controls (including electrically-heated glass).	X		X		X
Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair and replace weather-stripping. Correct squeaks, wind, water, or dust leaks using vapor seals, seam sealers, or door and window adjustments.			X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Replace and align the following door components: a. lock, b. remote control units.(rear view mirrors), c. key cylinders, e. hinges.	X		X		X
Inspect, repair or replace, and adjust removable, manually-operated, roof panel, and hinges, latches, guides, handles, retainer, and controls of sun roofs.	X		X		X
Inspect, repair and replace convertible top and related mechanisms.	X		X		X
Remove and replace steering wheels and turn signal switches. Remove and replace ignition locks. Demonstrate the procedures used in replacing and adjusting collapsible steering columns. Adjust mask jackets and gear selector levers.	X		X		X
List the various types of auto glass and explain the use of each. Explain the differences between tempered glass and laminated glass. Identify glass by its etched identification markings.	X		X		X
Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.	X		X		X
Demonstrate the installation and adjustment of: a. vent glass assembly, b. door glass, c. quarter glass, d. window regulator with or without power.	X		X		X
Determine when to use the partial cutout or full cutout method of repair when replacing a windshield.	X		X		X
Remove and replace fixed glass (heated and non-heated) using manufacturers' procedures.	X		X		X
Remove and replace modular glass using manufacturers' procedures.	X		X		X
Remove and replace butyl-retained, modular glass with mechanical fasteners.	X		X		X
Remove and replace urethane-retained, modular glass with mechanical fasteners.	X		X		X
Describe the legal problems/consequences resulting from incorrect collision/corrosion repairs.	X		X	X	X
Identify and explain the differences between unibody type construction and conventional type construction.	X		X	X	X
Identify and describe the five conventional frame designs and associate them with the year and make of auto.	X		X	X	X

Explain the importance of datum line and center line concepts as related to repairs/measurements.	X		X	X	X
Explain how unitized car body panels indicate misalignment and conventional body indicates frame misalignment. Explain and identify the zone system for zones 1 to 5.	X		X	X	X
Identify the maximum allowable tolerance for unibody dimensions and explain the importance of measuring.	X		X	X	X
Explain the importance of holes, bolts, and rivets as dimension points.	X		X	X	X
Explain hidden and secondary damages.	X		X	X	X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Use a conversion chart to convert inches and feet into metric measurements.	X	X	X		X
Convert metric measurements to inches and feet using a conversion chart.	X	X	X		X
Add and subtract mixed fractions and convert decimal and fractional measurements.	X	X	X		X
Identify and demonstrate the use of: a. extendable tram bar and steel tape rule, b. self-centering frame gauge, c. plumb bob, d. punometer, e. universal measuring system (mechanical or laser system), f. tracking gauge.	X	X	X		X
Use measuring systems to establish a datum line.	X	X	X		X
Diagnose and measure structural damage using tram and centering gauges according to manufacturers' specifications.	X	X	X		X
Diagnose and measure unibody damage using a dedicated (fixture) measuring system compared to specifications. Diagnose and measure unibody damage using a universal measuring system compared to specifications.	X	X	X		X
Determine the extent of the direct and indirect damage, and the direction of impact, and plan the methods and order of repair.	X		X		X
Compare damage dimensions with a frame specification manual and or manufacturers specification chart.	X		X		X
Identify the following unibody misalignment: a. sag, b. mash, length, c. twist, d. sidesway.	X		X		X
Identify coventional frame misalignment such as: a. sag, b. mash, length, c. twist, d. sidesway.	X		X		X
Identify collapsible areas on structural panels. Identify correction procedures on collapsible structural panels.	X		X		X
Identify bent or damaged steering, suspension, and power train components which can cause vibration, steering and 4-wheel alignment problems; replace in accordance with vehicle manufacturers' recommendations.	X		X		X
Inspect rear axle assembly for bending, warpage, and misalignment.	X		X		X

Diagnose steering column damage, looseness, and binding problems (including tilt mechanisms); determine needed repairs.	X		X		X
Diagnose manual steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, and hard steering problems; determine needed repairs.	X		X		X
Diagnose manual rack and pinion steering gear noises, vibration, looseness, and hard steering problems; determine needed repairs.	X		X		X
Diagnose power steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine needed repairs.	X		X		X
Diagnose power rack and pinion steering gear noises, vibration, looseness, hard steering, and fluid leakage problems; determine needed repairs.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Diagnose front and rear suspension noises, body sway, and ride height problems; determine needed repairs. Measure vehicle ride height, determine needed repairs.	X	X	X		X
Diagnose MacPherson strut suspension system noises, body sway, and ride height problems; determine needed repairs.	X		X		X
Diagnose vehicle wandering, pulling hard steering, bump steering, memory steering, torque steering, and steering return problems; determine needed repairs.	X		X		X
Check and adjust front and rear wheel camber on suspension systems with a camber adjustment.	X	X	X		X
Check front and rear wheel camber on non-adjustable suspension system; determine needed repairs.	X	X	X		X
Check and adjust caster on suspension systems with a caster adjustment.	X	X	X		X
Check caster on non-adjustable suspension systems; determine needed repairs.	X	X	X		X
Check and adjust front wheel toe. Check toe-out-on turns (turning radius); determine needed repairs.	X	X	X		X
Check SAI (steering axis inclination)/KPI (king pin inclination); determine needed repairs.	X	X	X		X
Check included angle; determine needed repairs.	X	X	X		X
Check rear wheel toe; determine needed repairs. Check rear wheel thrust angle, determine needed repairs.	X	X	X		X
Check for front wheel setback; determine needed repairs.	X	X	X		X
Diagnose tire wear patterns; determine needed repairs.	X	X	X		X
Inspect tires; check and adjust air pressure.	X	X	X		X
Diagnose wheel/tire vibration, shimmy, and tramp problems; determine needed repairs.	X	X	X		X
Measure wheel, tire, axle, and hub runout; determine needed repairs.	X	X	X		X
Center steering wheel.	X		X		X

Compare damage dimensions with a frame dimensions chart and alignment charts. Describe correction procedures.	X	X	X		X
Explain the differences between conventional frame racks and the floor tie-down method.	X		X	X	X
Describe common problems and errors in frame straightening and how to avoid them.	X		X	X	X
Describe straightening problems unique to unibody construction.	X		X	X	X
Review damage report, and analyze damage to determine appropriate methods for overall repair. Compare damage dimensions with a frame dimensions specification and alignment manual and or manufacturers specification chart.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Determine the extent of the direct and indirect damage, and the direction of impact, and plan the methods and order of repair.	X	X			X
Identify and describe procedures for correcting: a. buckle, b. mash, c. torn metal, d. wadded or crumpled metal.	X		X	X	X
Prepare a unitized body and frame for straightening: a. remove damaged or necessary exterior and interior trim and moldings, b. remove damaged, non-structural body panels and components that may interfere with repair, c. remove repairable plastics and other parts that are recommended for off-car repair, d. remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair, e. remove dirt, corrosion protection, under coatings, sealers and other protective coatings necessary to perform repairs to structural areas.	X		X		X
Demonstrate safe hook-up procedures for: a. mash, b. sidesway, c. sag, d. twist.	X		X		X
Demonstrate the proper procedures to: a. straighten and align mash (collapse) damage, b. straighten and align sag damage, c. straighten and align sidesway damage, d. straighten and align twist damage, e. straighten and align kickup damage, f. straighten and align diamond frame damage.	X		X		X
Demonstrate use of controlled heat. Demonstrate how to control heat through the use of temperature gauges or indicator crayons.	X	X	X		X
Apply heat stress relief methods and weld in accordance with vehicle manufacturers' recommendations	X	X	X		X
Apply cold stress relief methods; weld in accordance with vehicle manufacturers' recommendations.	X	X	X		X

Perform the following corrections with consideration of mash, sidesway, sag, and twist: a. straighten and align cowl assembly, b. straighten and align roof rails (headers) and roof panels, c. straighten and align all hinge and lock pillars, d. straighten and align all body openings, floor pans, and rocker panels, e. straighten and align quarter panels, wheel house assemblies, and rear body sections (including rails, suspension, and power train mounting points), f. straighten and align front end sections (aprons, strut towers, upper and lower rails, steering suspension, and power train mounting points, etc..).	X				X
Remove and replace damaged frame horns, side rails, crossmembers, front and rear sections.	X	X	X		X
Repair, reinforce, or replace weakened or cracked frame members in accordance with vehicle manufacturers' recommendations/industry standards.	X	X	X		X
Identify collapsible areas on structural panels. Identify correction procedures on collapsible structural panels.	X	X	X	X	X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Describe and perform correction procedures on non-collapsible structural panels. Determine the extent of damage to structural steel body panels; repair, weld, or replace in accordance with vehicle manufacturers' specifications/industry standards.	X		X	X	X
Recheck panel contour and alignment after repairing; correct or adjust as necessary.					X
Prepare a conventional body and frame for straightening: a. remove damaged or necessary exterior and interior trim and moldings, b. remove damaged, non-structural body panels and components that may interfere with repair, c. remove repairable plastics and other parts that are recommended for off-car repair, d. remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair, e. remove dirt, corrosion protection, under coatings, sealers and other protective coatings necessary to perform repairs to structural areas.	X		X		X
Demonstrate safe hook-up procedures for: a. mash, b. sidesway, c. sag, d. Diamond, e. twist.	X		X		X
Demonstrate the proper procedures to: a. straighten and align mash (collapse) damage, b. straighten and align sag damage, c. straighten and align sidesway damage, d. straighten and align twist damage, e. straighten and align kickup damage, f. straighten and align diamond frame damage.	X		X		X
Perform the following corrections after taking into account mash, sidesway, sag, diamond, and twist: a. correct damaged front frame section, b. correct damaged rear frame section, c. correct damaged frame rails.	X		X		X

Remove and replace damaged frame horns, side rails, crossmembers, front and rear sections.	X		X		X
Repair, reinforce, or replace weakened or cracked frame members in accordance with vehicle manufacturers' recommendations/industry standards.	X		X		X
Remove, replace, and align front and rear subframes.	X		X		X
Describe the method of "fish plating" and its importance.	X		X		X
Clean, prime and coat repaired unibody structural areas to restore vehicle manufacturers' level of corrosion protection. Clean, prime, and protective coat repaired conventional frame areas.	X		X		X
Review damage report, and analyze damage to determine appropriate methods for overall repair. Determine the extent of the direct and indirect damage, the direction of impact, and plan the methods and order of repair.	X		X		X
Remove damaged, non-structural body panels and components that may interfere with or be damaged during repair. Remove damaged or necessary outside or inside trim and moldings.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair.	X		X		X
Protect panels and parts adjacent to repair area to prevent damage.	X		X		X
Identify and explain the various techniques to remove spot welds.	X		X		X
Explain what are high strength steel (HSS) and precautions used during welding.	X		X	X	X
Identify the structural components which can be sectioned. Identify locations where not to section.	X		X		X
Determine the extent of damage to structural steel body panels; repair, weld, or replace in accordance with vehicle manufacturers' specifications/industry standards.	X		X		X
Explain the need to compare the sectioned parts dimensionally with specification manual.	X	X	X	X	X
Explain the procedures for metal preparation and dimensional accuracy required before attaching the replacement parts. Explain the need to return damaged rails and panels to their proper dimensions before removing parts.	X	X	X	X	X
Explain the necessity of proper sectioning repair procedures and methods. Identify and explain the purpose, usage, construction, and location of the following structural sectioning items: a. butt joint using inserts and plug weld, b. overlap joint, c. offset butt joint.	X		X	X	X

Perform structural panel sectioning in accordance with vehicle manufacturers' specifications/industry standards. Recheck panel contour and alignment after repairing; correct or adjust as necessary.	X		X		X
Identify and explain the purpose for: a. weld through primers, b. the need to use only MIG welding, c. the location and quantity of the replacement weld, d. the need for replacing corrosion protection in the repaired area, e. following recommended wire size, f. using factory repair manuals for reference.	X		X	X	X
Describe the effects of condensation, acid-rain, air-borne pollutants and road salt on unibody cars.	X		X	X	X
Describe how protective coatings are damaged: a. directly in area of impact, b. indirectly in areas away from impact region, c. during the repair process.	X		X	X	X
Discuss the special vulnerability of seams, joints, and pockets in body stamping. Explain the importance of resealing and caulking the sectioned panels.	X		X	X	X
Identify the two principle methods of corrosion protection used on unibody cars.	X		X	X	X
Define electrolytic corrosion, and describe how zinc-rich coatings help prevent it.	X		X	X	X
Describe the problems of corrosion caused by dissimilar metal body trim and accessories, and explain how to deal with them. Given a list of dissimilar body accessory problems, explain the correct method of eliminating the galvanic corrosion in each case.	X		X	X	X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Clean, prime and coat repaired unibody structural areas to restore vehicle manufacturers' level of corrosion protection.	X		X		X
Describe the effects of poor workmanship in corrosion resistance in terms of: a. initial appearance vs. long-term integrity, b. loss of adhesion, c. surface failure, d. structural failure.			X	X	X
Describe the role of the following three surface preparation products used in body work: a. wax and grease remover, b. metal conditioner, c. conversion coating.			X	X	X
Correctly apply wax and grease remover and test the surface for cleanliness.	X		X		X
Clean and condition sheet metal for refinishing.	X		X		X
Read and understand the manufacturer's product information for application of surface preparation materials.	X		X		X
Describe the products and procedures applicable to corrosion protection of closed body sections and exposed interior surfaces. Plan the correct step-by-step procedure for applying corrosion protection to closed body sections and exposed interior surfaces, using a planning checklist. Demonstrate the selection and application of a protective finish to a closed body section and an exposed interior surface.	X		X	X	X

Describe the products and procedures applicable to corrosion protection of exposed body panel joints. Plan the correct step-by-step procedure for completing the corrosion protection of exposed body panel joints, using a planning checklist. Demonstrate the selection and application of a protective finish to an exposed body panel joint.	X		X	X	X
Describe the products and procedures applicable to corrosion protection of exterior exposed surfaces. Plan the correct step-by-step procedure for completing the corrosion protection of exposed exterior surfaces, using a planning checklist. Select and apply the correct protective finish to an exterior exposed body surface.	X		X	X	X
Explain the importance of proper frame alignment in terms of effect upon alignment of sheet metal.			X	X	X
Describe how the procedures for front sheet metal replacement and alignment on a unibody frame design differ from the procedures used on a conventional body design. Describe how to replace and align the core support in frame and unibody vehicles. Explain the function of the core support. Check and adjust clearance of front fenders, headers, and other panels.	X		X	X	X
Remove, replace and align: a. hood, hood hinges, and hood latch, b. deck lid, lid hinges, and lid latch, c. tailgates, hatches, lift gates, latches assemblies and hinges.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Check door hinge condition; check door frames for proper fit; check and adjust door clearances (where adjustable) along quarter panel, door, rocker panel, fender, and top with sedan and hard-top doors on a conventional and a unibody automobile.			X		X
Replace and align: a. front sheet metal assembly in a unibody constructed type of automobile, b. front sheet metal assembly on a conventional framed type of automobile			X		X
Remove, replace, and align bumpers, reinforcements, guards, isolators, and mounting hardware. Demonstrate safe procedures for removal of bumper energy absorbing devices and explain the safety precautions to be observed. Overhaul front and rear bumper assemblies.	X		X	X	X
Demonstrate all safety precautions pertaining to the use of cutting equipment. Explain how a panel should be cut. Demonstrate the removal of a damaged panel.	X		X	X	X
Demonstrate the procedures used in preparing inner structures for installing a new panel. Remove and replace all components necessary to install a panel.			X		X
Determine the extent of damage to aluminum body panels; repair, weld or replace in accordance with manufacturers' specifications.			X		X
Braze body panels only in locations recommended by vehicle manufacturer.			X		X

Remove and replace welded steel panel or panel assembly. Cut out damaged sections of sheet steel body panels and weld in replacements according to vehicle and industry specifications. Install at least one of the following panels: a. door panel, b. rocker panel, c. rear body panel, d. quarter panel.			X		X
Repair or replace door skins and intrusion beams in accordance with vehicle manufacturers' specification.	X		X		X
Weld cracked or torn steel body panels; reweld broken welds.			X		X
Identify and explain the five wheel alignment angles. Inspect and adjust (where applicable) steering linkage geometry (attitude/parallelism).	X		X	X	X
Perform front end and four wheel alignment on suspension systems.	X		X		X
Identify the following suspension systems and the major components of each of the suspension systems: a. upper coil (unitized body), b. lower coil (conventional), c. torsion bar (any Chrysler product), d. straight axle (pickup), e. McPherson strut suspension.	X		X		X
Identify suspension system fasteners which should not be reused.	X		X		X
Disassemble and reassemble the following suspension systems: a. upper coil (unitized body), b. lower coil (conventional), c. torsion bar (any Chrysler product), d. straight axle (pickup), e. McPherson strut suspension.	X		X		X
Remove and replace upper and lower control arms and control arm bushings, shafts, and rebound bumpers.	X		X		X

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Remove and replace strut rods and bushings on long and short arm suspension systems.	X		X		X
Remove and replace upper and lower ball joints on short and long arm suspension systems.	X		X		X
Remove and replace steering knuckle/spindle assemblies.	X		X		X
Remove and replace front suspension system coil springs and spring insulators (silencers)	X		X		X
Inspect, replace, and adjust front suspension system torsion bars; inspect mounts.	X		X		X
Inspect and replace stabilizer bar bushings, brackets, and links.	X		X		X
Inspect and replace McPherson strut cartridge or assembly, upper bearing, and mount.	X		X		X
Remove and replace rear suspension system coil springs and spring insulators (silencers).	X		X		X
Inspect, remove and replace rear suspension system transverse links, control arms, stabilizer bars, bushing and mounts.	X		X		X
Inspect, remove and replace rear suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings and mounts.	X		X		X

Demonstrate procedures for checking shock absorbers. Remove and replace shock absorbers. Inspect and replace air shock absorbers, load-leveling devices, air springs, and associated lines and fittings. Diagnose, inspect, adjust, repair or replace components of electronically-controlled suspension systems.	X		X		X
Identify and explain the operation of a conventional steering system.	X		X	X	X
Remove and replace power steering gear (non-rack and pinion type).	X		X		X
Identify and explain the operation of a rack and pinion steering system.	X		X	X	X
Remove and replace power rack and pinion steering gear; inspect and replace mounting bushings and brackets, ensure proper mounting location. Inspect and replace rack and pinion steering gear - inner tie rod ends (sockets), and bellows boots.	X		X		X
Inspect, adjust tension and alignment, and replace power steering pump belt(s).	X		X		X
Explain the function, difference, and operation of conventional and rack and pinion power steering.	X		X	X	X
Perform the following preliminary power steering checks: a. fluid level, b. belt tension, c. hose leaks, d. hose kinks e. inspect all steering linkage, f. check tires for equal size and inflation, g. check tire wear patterns for out of alignment, h. purge the system for trapped air, i. list the procedure for checking power steering.	X		X		X
Remove and replace power steering pump; inspect pump mounts.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Inspect and replace power steering hoses and fittings.	X		X		X
Identify and explain the operation of a four-wheel steering system.	X		X	X	X
Install steering linkage parts.	X		X		X
Inspect and replace pitman arm, relay (center link/intermediate) rod, idler arm and mounting.	X		X		X
Remove, replace, and adjust tie rods, tie rod sleeves, clamps, and tie rod ends (sockets).	X		X		X
Remove and replace steering linkage damper.	X		X		X
Inspect and replace steering shaft U-joint(s), flexible coupling(s), collapsible columns, and steering wheels.	X		X		X
Demonstrate the procedures used in replacing and adjusting collapsible steering columns.	X		X		X
Remove and replace steering wheels and turn signal switches. Remove and replace ignition locks.	X		X		X
Adjust mask jackets and gear selector levers.	X		X		X
Rotate tires according to manufacturers' recommendations.	X		X		X
Diagnose tire pull (lead) problems; determine corrective actions.	X		X		X

Perform wheel balancing. Balance wheel and tire assembly (static and/or dynamic).	X		X		X
Describe and demonstrate the selection and use of terminals, splices, and related tools including a discussion of size, color, insulation and length of connection. Solder electrical wiring.	X		X	X	X
Interpret and use a schematic diagram and color code.	X	X	X		X
Identify programmable electrical/electronic components; record date for programming before disconnecting battery.	X	X	X		X
Explain the basic operation of a battery. Explain the hazards of battery acid. Demonstrate cleaning, inspection, and replacement procedures for batteries. Perform battery state-of-charge test, determine needed service. Perform slow/fast battery charge in accordance with manufacturers' recommendation.	X	X	X	X	X
Inspect, clean, and repair or replace battery cables, connectors, and clamps.	X		X		X
Inspect, adjust, and replace alternator drive belts, pulleys, and fans. Remove and replace alternator.	X		X		X
Check voltages in electrical wiring circuits with a voltmeter; determine needed repairs.	X	X	X		X
Check continuity and resistances in electrical wiring circuits and components with an ohmmeter; determine needed repairs.	X	X	X		X
Check electrical wiring circuits with jumper wires; determine needed repairs.	X		X		X
Inspect, test, and replace fusible links, circuit breakers, and fuses.	X	X	X		X

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Remove and replace headlights, parking/taillights, stoplights, flashers, turn-signals, and backup lights; check operation.	X		X		X
Inspect, replace, and aim headlights/bulbs. Check operation of retractable headlight assembly. Demonstrate headlight adjustment on single headlights, dual headlights, and hideaway lights. Overhaul headlight assemblies.	X		X		X
Remove and replace motors, switches, relays, connectors, and wires of retractable headlight assembly circuits.	X		X		X
Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, and wires of all light circuits including four-wire taillight systems.	X	X	X		X
Remove and replace horn(s); check operation.	X		X		X
Check operation of windshield wiper/washer system.	X		X		X
Check operation of electrically heated mirrors, windshields, backlights, panels, etc.; repair as necessary.	X		X		X
Remove and replace components of power antenna circuits; check operation	X		X		X
Check for serviceability of electric motors which are used in electric windows, seats, and mirrors.	X		X		X

Troubleshoot failure of: a. fuel gauge, b. directional lights, c. stop and tail lights, d. headlights, e. horn, f. electric seats, windows, trunk latches, etc..., g. dome lighting.	X	X	X		X
Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports; replace brake lines (double flare and ISO types), hoses, fittings and supports.	X		X		X
Inspect flexible brake hoses for leaks, kinks, cracks, bulging, or wear; tighten loose fittings and supports.	X		X		X
Select, handle, store, and install brake fluids, (including silicone fluids).	X		X		X
Bleed (manual, pressure, vacuum, or surge) and/or flush hydraulic brake system in accordance with manufacturers' procedures.	X		X		X
Pressure test brake hydraulic system by applying heavy force to pedal, hold for 15 seconds and inspect for leaks.	X		X		X
Adjust brake shoes and reinstall brake drums or drum/hub assemblies and wheel bearings.	X		X		X
Reinstall wheel, torque lug nuts, and make final checks and adjustments.	X	X	X		X
Remove and replace caliper assembly.	X		X		X
Clean and inspect caliper mounting and slides for wear and damage.	X		X		X
Check parking brake system operation.	X		X		X
Inspect, adjust, and replace A/C compressor drive belts and pulleys.	X		X		X

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Discharge A/C system of R-12.	X		X		X
Flush A/C system components and hoses.	X		X		X
Charge A/C system with R-12 (liquid or vapor); perform leak test.	X	X	X		X
Inspect and correct oil level in A/C system.	X		X		X
Describe the safety precautions to be followed when disconnecting pressure lines on an automotive air conditioner.	X		X	X	X
Describe the dangers of moisture and air in a refrigeration system. (Seal all openings as soon as disconnected.)	X		X	X	X
Remove and replace A/C compressor; inspect, repair or replace A/C compressor mounting.	X		X		X
Inspect, repair or replace A/C system mufflers, hoses, lines, fittings, and seals.	X		X		X
Inspect A/C condenser for air flow restrictions; clean and straighten fins.	X		X		X
Inspect, test, and replace A/C system condenser and mounting.	X		X		X
Inspect and replace receiver/drier or accumulator/drier.	X		X		X
Inspect, test and replace evaporator.	X		X		X

Inspect and repair evaporator housing water drain.	X		X		X
Inspect, test, repair or replace heating, ventilating, and A/C vacuum components.	X		X		X
Inspect and repair A/C component wiring.	X	X	X		X
Inspect, test, and repair heating, ventilating, and A/C ducts, doors, hoses, and outlets.	X		X		X
Inspect, flush, and replace heater core.	X		X		X
List the three major purposes of an engine cooling system. Explain how a "closed cooling system" differs from a conventional cooling system.	X		X	X	X
Identify and describe the function of following engine cooling system parts: a. radiator, b. pressure cap, c. water pump, d. thermostat.	X		X	X	X
Describe causes for radiator overheating. Test for radiator leaks while radiator is mounted in the car.	X		X	X	X
Check for radiator leaks using test tank. Disassemble and assemble radiator parts. Perform minor radiator repairs. Block off tubes. Recore radiators.	X		X		X
Inspect and replace engine cooling and heater system hoses and belts.	X		X		X
Inspect, remove, and replace radiator, pressure cap, coolant recovery system, water pump and thermostat, by-pass and housing.	X		X		X
Drain, flush, and refill system with proper coolant and level of protection.	X		X		X
Remove and replace fan, fan clutch (both electrical and mechanical), and fan shroud.	X		X		X
Assessment of Intended Student Learning Competancies and COWIQ					
	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Inspect, remove, and replace auxiliary oil coolers.	X		X		X
Remove and replace shift or clutch linkage as required.	X		X		X
Remove and replace cables or linkages for throttle valve (TV), kickdown, and accelerator pedal.	X		X		X
Remove and replace electronic sensors, wires, and connectors.	X		X		X
Remove and replace power train assembly inspect, replace, and align power train mounts.	X		X		X
Remove and replace rear axle assembly.	X		X		X
Measure and/or adjust half shaft position/angle.	X		X		X
Remove, inspect, and replace front-drive half shafts and axle knuckles.	X		X		X
Remove, inspect, and replace exhaust manifold, manifold heat control valves (heat risers), exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields.	X		X		X
Remove, inspect, and replace gas tank, gas tank filter, and gas cap; inspect and replace fuel lines and hoses; check fuel for contaminants.	X		X		X

Remove and replace or remove and install fuel tanks, sending units, fuel line, and pollution control equipment.	X		X		X
Remove, inspect, and replace liquid/vapor separator, liquid check valve, lines, and hoses of fuel vapor control systems.	X		X		X
Remove, inspect and replace canister, filter, and purge lines of fuel vapor control systems.	X		X		X
Remove, inspect, and replace pump, pressure relief valve, filter, pulley, and belt of pump-type air injection systems.	X		X		X
Remove, inspect, and replace hoses, check valves, air manifolds, and nozzles of pump-type air injection systems.	X		X		X
Remove, inspect, and replace pulse air valve(s) and hoses of exhaust pulse-type air injection systems.	X		X		X
Remove, inspect, and replace heat stove shroud, hot air pipe, and damper of inlet air temperature control systems.	X		X		X
Verify proper operation of active restraint seatbelt and shoulder harness system in accordance with manufacturers' procedures. Remove and replace seatbelt and shoulder harness assembly in accordance with manufacturers' procedures. Inspect anchorage for deformation; repair as required.	X		X		X
Verify proper operation of passive restraint seatbelt and shoulder harness system in accordance with manufacturers' procedures. Remove and replace seatbelt and shoulder harness assembly in accordance with manufacturers' procedures. Inspect anchorages for deformation; repair as required.	X		X		X

Assessment of Intended Student Learning Competancies and COWIQ	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Remove and replace track and drive assembly, lap retractor. torso retractor assembly, inboard buckle-lap retractor, knee blocker, etc..	X		X		X
Use fault codes to diagnose and repair airbag system.	X	X	X		X
Disarm airbag system in accordance with manufacturers' procedures.	X		X		X
Inspect and replace damaged sensors and wiring in accordance with manufacturers' procedures; insure proper sensor orientation.	X		X		X
Replace deployed airbag modules in accordance with manufacturers' procedures.	X		X		X
Verify that system is armed and operational in accordance with manufacturers, procedures.	X		X		X
Remove and replace non-deployed airbag; observe manufacturers' safety procedures.	X		X		X
Demonstrate and explain the use of: a. epoxy resin, b. polyester resin, c. fiberglass cloth, d. mill fiber, e. chopped glass, f. catalyst, g. acetone, h. plastic filler.	X		X		X

Diagnose fiberglass damage and determine the materials and techniques to be used. Repair cosmetic damage. Repair both accessible and inaccessible minor fiberglass structural damage. Fabricate for patching. Demonstrate clean-up and preparation for paint application.	X		X		X
Observe all safety rules pertaining to the use of fiberglass.	X		X		X
Demonstrate and explain the use of: a. fiberglass matting, b. roving, c. gel coating, d. P.V.A.	X		X		X
Repair both accessible and inaccessible major fiberglass structural damage. Fabricate for patching. Demonstrate clean-up and preparation for paint application.	X		X		X
Identify the types of plastics to be repaired. Demonstrate proper procedures for identification of plastics to be repaired: a. identify by symbol, b. identify by weld test.	X		X		X
Identify the types of plastic repair procedures.	X		X		X
Discuss the safety, care, and use of welding equipment and materials used for plastic repair.	X		X	X	X
Repair rigid plastic parts with: a. hot air welding, b. airless welding, c. urethane or epoxy adhesives, d. urethane or epoxy adhesives and fiberglass reinforcements.	X		X		X
Repair flexible plastic parts with: a. airless welding, b. urethane or epoxy adhesives, c. urethane or epoxy adhesives and fiberglass reinforcements.	X		X		X
Repair holes and cuts in rigid and flexible plastic parts using backing materials and adhesives.	X		X		X

Assessment of Intended Student Learning Competancies and COWIQ

	Standard 1 - Written Communication	Standard 2 - Quantitative Reasoning	Standard 3 - Information Retrieval and Technology	Standard 4 - Oral Communication	Standard 5 - Critical Thinking
Discuss and demonstrate exterior plastic repair and refinishing: a. surface preparation of at least two different types of exterior plastics for welding. (single and two-sided), b. surface preparation for plastic repair using a structural adhesive, c. refinish repaired panels, d. reshape and shrink damaged exterior plastic, e. retexture exterior plastic parts.	X		X	X	X
Discuss and demonstrate interior plastic repair and refinishing: a. interior plastic, b. surface preparation of at least two different types of interior plastics for repair by welding, c. retexture and refinish repaired interior plastic panels, d. repair vinyl-clad urethane foam panels, distorted and torn.	X		X	X	X
Remove damaged areas from rigid exterior sheet molded compound (SMC) and bulk molded compound (BMC) panels; repair with partial panel installation.	X		X		X
Define the following terms: a. estimating, b. overlap, c. flat rate, d. time and material, e. old damage, f. hidden damage, g. betterment, h. discount.	X	X	X		X
List and explain the four functions of an estimate.	X		X	X	X

Complete an estimate form heading.	X		X		X
Prepare an estimate for a given repair situation.	X	X	X		X
Explain the various kinds of insurance coverage encountered in the auto body repair industry.	X		X	X	X
Explain what items should be listed under "sublet" and the reason for subletting work.	X		X	X	X
Calculate the labor charge based on flat rates.	X	X	X		X
Anticipate the presence and extent of hidden damage.	X		X		X
Calculate percentage cost repairs.	X	X	X		X
Explain the differences to consider when estimating the cost to repair a car with unitized construction as compared to one with conventional frame construction.	X	X	X	X	X
Estimate fiberglass and plastic repairs.	X	X	X		X
Explain the procedures involved in figuring total losses and salvage.	X	X	X	X	X
Write estimates for automobile repairs as detailed in collision repair manuals.	X	X	X		X

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Use the proper angle of the gun to the joint, and the direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions. Demonstrate bead or seam welding in the following positions: a. flat, b. vertical, c. horizontal, d. overhead.		X		X	X										X	X	X	X					X
Assessment of Intended Student Learning Competancies	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I			
Using 24 gauge or thinner sheet metal, repair an area with a large patch and restore to original contour without excessive warpage. Determine the correct joint type (butt, lap, etc.) for weld being made. Determine the correct type of weld (continuous, stitch/pulse, tack, plug, etc.) for each specific weld repair.		X		X	X								X	X	X	X							
Identify cause(s) of spits and sputters, burn through, lack of penetration, cracks in metal, porosity, incomplete fusion, excessive spatter, distortion, and waviness of bead; make necessary adjustments.		X		X	X								X	X	X	X							X
Identify cause(s) of contact tip burn-back and failure of wire to feed; make necessary adjustments.		X		X	X								X	X	X	X							X
Describe the theory of operation of the thermal arc plasma cutter. List, identify, and discuss the functions on the control panel and torch body. Demonstrate in proper sequence the pre-operation se-up on the control panel and the shut-down of the panel.		X		X	X								X	X	X	X							X
List a minimum of four safety precautions that are observed to prevent possible injuries.		X		X	X								X	X	X	X							X
List the precautions to observe when using the torch on an automobile.		X		X	X								X	X	X	X							X
Demonstrate the correct use of the cutting operation using the torch.		X		X	X								X	X	X	X							X
Demonstrate cutting in the following positions using auto body sheet metals and conventional frame metals: a. flat, b. vertical, c. horizontal, d. overhead.		X																					
Demonstrate plasma arc torch maintenance.		X		X	X								X	X	X	X							X
Identify three common cutting faults and all of the probable causes for each.		X		X	X								X	X	X	X							X
Discuss safety, equipment and care of resistance spot welder used in auto body repair. Demonstrate set-up and shut-down of resistance spot welder.		X		X	X								X	X	X	X							X
Discuss advantages and disadvantages of the resistance spot welder.		X		X	X								X	X	X	X							X
Demonstrate proper procedures of replacing a panel using the resistance spot welder.		X		X	X								X	X	X	X							X
Diagnose damaged areas and explain the sequence of repair. Determine the extent of the direct and indirect damage, the direction of impact, and plan the methods and order of repair.											X	X	X	X	X	X							X
Describe the physical changes that take place when sheet metal is formed or damaged. Description must refer to work hardening, heat, stretching, and shrinking.		X		X	X								X	X	X	X							X

Remove dirt, grease, and wax from those areas to be repaired. Remove dirt, corrosion protection, under coatings, sealers, and other protective coatings necessary to perform repairs to structural areas.		X													X	X	X	X				X
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Assessment of Intended Student Learning Competencies

	ABRP 20E	ABRP 20F	ABRP 20G	ABRP 20H	ABRP 20I	ABRP 22E	ABRP 22F	ABRP 22G	ABRP 22H	ABRP 22I	ABRP 40E	ABRP 40F	ABRP 40G	ABRP 40H	ABRP 40I	ABRP 41E	ABRP 41F	ABRP 41G	ABRP 41H	ABRP 41I
Straighten roughed out contours of damaged panel to a surface condition for body filling or metal finishing using power and hand tools. A. Grind the paint from the damaged area of the body panel, B. Demonstrate the use of both pneumatic and electric portable disc grinders, C. Demonstrate the use of body hammers and dollies, D. Demonstrate the use of spoons and pry bars, E. Demonstrate the procedures of using heat in the shrinking of metal, F. Weld cracked or torn steel body panels; reweld broken welds, G. Heat shrink stretched panel areas back to contour, H. Cold shrink stretched panel areas back to contour, I. Restore contour with heat, J. Pick and file the damaged are of a body panel to eliminate surface irregularities, K. Disc sand the repaired body panel to produce final smoothness, L. Demonstrate surface preparation procedures for applying body filler.			X	X	X							X	X	X	X	X				X
Describe the physical changes that take place when sheet metal is formed or damaged. Description must refer to work hardening, heat, stretching, and shrinking.		X		X	X							X	X	X	X	X				X
Describe how car bodies have changed in the last several years in terms of weight, materials, construction and longevity. Discuss issues related to corrosion protection structural integrity. Differentiate between the effects of corrosion on unibody vs. conventional frame type of cars.	X			X															X	X
Describe how original equipment manufacturers prevent corrosion and enhance the longevity of auto body components and finishes.				X								X	X	X	X	X			X	X
Identify the equipment components and procedures required to apply anti-corrosion compounds.				X								X	X	X	X	X			X	X
Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas. Reapply the undercoat, or other sound deadener, from the underside of damaged sheet metal.				X								X	X	X	X	X			X	X
Properly mix plastic and catalysts taking into consideration the effects of temperature. Mix plastic body filler. Demonstrate techniques of applying plastic fillers. Apply plastic body filler and cheese-grate during curing. Rough sand cured plastic filler to contour; finish sand.			X	X	X							X	X	X	X	X			X	X
Demonstrate finishing techniques on flat panels, low crown, medium crown, high crown, style lines, and reverse contours using plastic filler. Demonstrate procedures used in repairing panels which have been previously repaired with plastic filler.			X	X	X							X	X	X	X	X			X	X
Describe the process of using body solder.		X																		
Explain and demonstrate basic alignment procedures of auto sheet metal. Demonstrate removal and installation of parts and trim according to job description.											X	X	X	X	X	X				X

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Identify pin-holing (solvent popping) and blistering appearance in the paint surface; determine the cause(s), and correct the condition.							X	X	X	X									
Identify body-filler bleed-through or pin-holing; correct the condition.							X	X	X	X									
Identify tape tracking; determine the cause(s), and correct the condition.							X	X	X	X									
Identify bleed-through; determine the cause(s), and correct the condition.							X	X	X	X									
Apply stone chip-resistant coating to lower body areas.							X	X	X	X									
Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas.							X	X	X	X									

Assessment of Intended Student Learning Competancies	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I
Select and perform sanding, buffing, and polishing processes for finish.							X	X	X	X										
Identify buffing-wheel burns on a painted surface; determine the cause(s), and correct the condition.							X	X	X	X										
Identify the types of rigid and flexible plastic parts to be finished; determine correct materials and refinishing procedures. Apply finish coat to rigid and flexible plastic parts.							X	X	X	X										
Clean, condition, and refinish vinyl (e.g., upholster, dashes, and tops).							X	X	X	X										
Clean and detail vehicle after complete refinishing. Demonstrate detailing methods on the following: a. weather-stripping and other rubber surfaces, b. glass, c. wheel house, d. chrome, e. tires and wheels, f. instrument panel, g. perform check of running lights.							X	X	X	X										
Demonstrate the correct procedure for cleaning each of the major kinds of auto fabrics.							X	X	X	X										
Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc..							X	X	X	X										X
Remove damaged or necessary exterior trim and moldings. Remove and replace the following: a. rocker molding, b. side molding, c. belt molding, d. peak molding, e. drip rail scalp molding.											X				X					X
State type of molding and ornament installation appropriate to the year and make of car. Install the following accessories: a. remote control mirrors, b. side view mirrors, c. radio antenna, d. bumper and grille guards, e. door edge moldings (OEM and non-OEM)											X				X					X
Demonstrate the removal and replacement of seats and seat tracks, both manual and electric.											X				X					X
Demonstrate how to remove and replace a headliner.											X				X					X
Describe how to replace a padded instrument panel.											X				X					X
Remove damaged, non-structural body panels and components that may interfere with or be damaged during repair.											X				X					X

Overhaul front and rear bumper assemblies.													X				X							X
Install woodgrain transfer and striping kits.													X				X							X
Demonstrate how to remove, replace and repair a vinyl top.													X				X							X
Remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair.													X				X							X
Remove repairable plastics and other parts that are recommended for off-car repair.													X				X							X
Repair or replace all power-driven accessories and related controls (including electrically-heated glass).													X				X							X
Assessment of Intended Student Learning Competancies	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I				
Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair and replace weather-stripping. Correct squeaks, wind, water, or dust leaks using vapor seals, seam sealers, or door and window adjustments.														X				X						X
Replace and align the following door components: a. lock, b. remote control units.(rear view mirrors), c. key cylinders, e. hinges.														X				X						X
Inspect, repair or replace, and adjust removable, manually-operated, roof panel, and hinges, latches, guides, handles, retainer, and controls of sun roofs.														X				X						X
Inspect, repair and replace convertible top and related mechanisms.														X				X						X
Remove and replace steering wheels and turn signal switches. Remove and replace ignition locks. Demonstrate the procedures used in replacing and adjusting collapsible steering columns. Adjust mask jackets and gear selector levers.														X				X						X
List the various types of auto glass and explain the use of each. Explain the differences between tempered glass and laminated glass. Identify glass by its etched identification markings.														X				X						X
Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.														X				X						X
Demonstrate the installation and adjustment of: a. vent glass assembly, b. door glass, c. quarter glass, d. window regulator with or without power.														X				X						X
Determine when to use the partial cutout or full cutout method of repair when replacing a windshield.														X				X						X
Remove and replace fixed glass (heated and non-heated) using manufacturers' procedures.														X				X						X
Remove and replace modular glass using manufacturers' procedures.														X				X						X
Remove and replace butyl-retained, modular glass with mechanical fasteners.														X				X						X
Remove and replace urethane-retained, modular glass with mechanical fasteners.														X				X						X

Describe the legal problems/consequences resulting from incorrect collision/corrosion repairs.															X	X	X	X	X	X				X
Identify and explain the differences between unibody type construction and conventional type construction.	X														X	X	X	X	X	X				X
Identify and describe the five conventional frame designs and associate them with the year and make of auto.	X														X	X	X	X	X	X				X
Explain the importance of datum line and center line concepts as related to repairs/measurements.															X	X	X	X	X	X				X
Explain how unitized car body panels indicate misalignment and conventional body indicates frame misalignment. Explain and identify the zone system for zones 1 to 5.															X	X	X	X	X	X				X

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Identify the maximum allowable tolerance for unibody dimensions and explain the importance of measuring.															X	X	X	X	X	X				X
Explain the importance of holes, bolts, and rivets as dimension points.															X	X	X	X	X	X				X
Explain hidden and secondary damages.															X	X	X	X	X	X				X
Use a conversion chart to convert inches and feet into metric measurements.	X														X	X	X	X	X	X				X
Convert metric measurements to inches and feet using a conversion chart.	X														X	X	X	X	X	X				X
Add and subtract mixed fractions and convert decimal and fractional measurements.	X														X	X	X	X	X	X				X
Identify and demonstrate the use of: a. extendable tram bar and steel tape rule, b. self-centering frame gauge, c. plumb bob, d. punometer, e. universal measuring system (mechanical or laser system), f. tracking gauge.															X	X	X	X	X	X				X
Use measuring systems to establish a datum line.															X	X	X	X	X	X				X
Diagnose and measure structural damage using tram and centering gauges according to manufacturers' specifications.															X	X	X	X	X	X				X
Diagnose and measure unibody damage using a dedicated (fixture) measuring system compared to specifications. Diagnose and measure unibody damage using a universal measuring system compared to specifications.															X	X	X	X	X	X				X
Determine the extent of the direct and indirect damage, and the direction of impact, and plan the methods and order of repair.															X	X	X	X	X	X				X
Compare damage dimensions with a frame specification manual and or manufacturers specification chart.															X	X	X	X	X	X				X
Identify the following unibody misalignment: a. sag, b. mash, length, c. twist, d. sidesway.															X	X	X	X	X	X				X
Identify coventional frame misalignment such as: a. sag, b. mash, length, c. twist, d. sidesway.															X	X	X	X	X	X				X

Identify collapsible areas on structural panels. Identify correction procedures on collapsible structural panels.															X	X	X	X	X	X				X
Identify bent or damaged steering, suspension, and power train components which can cause vibration, steering and 4-wheel alignment problems; replace in accordance with vehicle manufacturers' recommendations.																				X				X
Inspect rear axle assembly for bending, warpage, and misalignment.																				X				X
Diagnose steering column damage, looseness, and binding problems (including tilt mechanisms); determine needed repairs.																				X				X
Diagnose manual steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, and hard steering problems; determine needed repairs.																				X				X
Diagnose manual rack and pinion steering gear noises, vibration, looseness, and hard steering problems; determine needed repairs.																				X				X
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Diagnose power steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine needed repairs.																				X				X
Diagnose power rack and pinion steering gear noises, vibration, looseness, hard steering, and fluid leakage problems; determine needed repairs.																				X				X
Diagnose front and rear suspension noises, body sway, and ride height problems; determine needed repairs. Measure vehicle ride height, determine needed repairs.																				X				X
Diagnose MacPherson strut suspension system noises, body sway, and ride height problems; determine needed repairs.																				X				X
Diagnose vehicle wandering, pulling hard steering, bump steering, memory steering, torque steering, and steering return problems; determine needed repairs.																				X				X
Check and adjust front and rear wheel camber on suspension systems with a camber adjustment.																				X				X
Check front and rear wheel camber on non-adjustable suspension system; determine needed repairs.																				X				X
Check and adjust caster on suspension systems with a caster adjustment.																				X				X
Check caster on non-adjustable suspension systems; determine needed repairs.																				X				X
Check and adjust front wheel toe. Check toe-out-on turns (turning radius); determine needed repairs.																				X				X
Check SAI (steering axis inclination)/KPI (king pin inclination); determine needed repairs.																				X				X
Check included angle; determine needed repairs.																				X				X

Check rear wheel toe; determine needed repairs. Check rear wheel thrust angle, determine needed repairs.																		X			X
Check for front wheel setback; determine needed repairs.																		X			X
Diagnose tire wear patterns; determine needed repairs.																		X			X
Inspect tires; check and adjust air pressure.																		X			X
Diagnose wheel/tire vibration, shimmy, and tramp problems; determine needed repairs.																		X			X
Measure wheel, tire, axle, and hub runout; determine needed repairs.																		X			X
Center steering wheel.													X	X	X	X	X	X			X
Compare damage dimensions with a frame dimensions chart and alignment charts. Describe correction procedures.													X	X	X	X	X	X			X
Explain the differences between conventional frame racks and the floor tie-down method.													X	X	X	X	X	X			X
Describe common problems and errors in frame straightening and how to avoid them.													X	X	X	X	X	X			X

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Describe straightening problems unique to unibody construction.												X	X	X	X	X	X			X
Review damage report, and analyze damage to determine appropriate methods for overall repair. Compare damage dimensions with a frame dimensions specification and alignment manual and or manufacturers specification chart.												X	X	X	X	X	X			X
Determine the extent of the direct and indirect damage, and the direction of impact, and plan the methods and order of repair.												X	X	X	X	X				X
Identify and describe procedures for correcting: a. buckle, b. mash, c. torn metal, d. wadded or crumpled metal.												X	X	X	X	X				X
Prepare a unitized body and frame for straightening: a. remove damaged or necessary exterior and interior trim and moldings, b. remove damaged, non-structural body panels and components that may interfere with repair, c. remove repairable plastics and other parts that are recommended for off-car repair, d. remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair, e. remove dirt, corrosion protection, under coatings, sealers and other protective coatings necessary to perform repairs to structural areas.												X	X	X	X	X				X
Demonstrate safe hook-up procedures for: a. mash, b. sidesway, c. sag, d. twist.												X	X	X	X	X				X
Demonstrate the proper procedures to: a. straighten and align mash (collapse) damage, b. straighten and align sag damage, c. straighten and align sidesway damage, d. straighten and align twist damage, e. straighten and align pickup damage, f. straighten and align diamond frame damage.												X	X	X	X	X				X

Demonstrate use of controlled heat. Demonstrate how to control heat through the use of temperature gauges or indicator crayons.														X	X	X	X	X					X
Apply heat stress relief methods and weld in accordance with vehicle manufacturers' recommendations														X	X	X	X	X					X
Apply cold stress relief methods; weld in accordance with vehicle manufacturers' recommendations.														X	X	X	X	X					X
Perform the following corrections with consideration of mash, sidesway, sag, and twist: a. straighten and align cowl assembly, b. straighten and align roof rails (headers) and roof panels, c. straighten and align all hinge and lock pillars, d. straighten and align all body openings, floor pans, and rocker panels, e. straighten and align quarter panels, wheel house assemblies, and rear body sections (including rails, suspension, and power train mounting points), f. straighten and align front end sections (aprons, strut towers, upper and lower rails, steering suspension, and power train mounting points, etc..).														X	X	X	X	X					X
Remove and replace damaged frame horns, side rails, crossmembers, front and rear sections.														X	X	X	X	X					X
Repair, reinforce, or replace weakened or cracked frame members in accordance with vehicle manufacturers' recommendations/industry standards.														X	X	X	X	X					X
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Identify collapsible areas on structural panels. Identify correction procedures on collapsible structural panels.														X	X	X	X	X					X
Describe and perform correction procedures on non-collapsible structural panels. Determine the extent of damage to structural steel body panels; repair, weld, or replace in accordance with vehicle manufacturers' specifications/industry standards.														X	X	X	X	X					X
Recheck panel contour and alignment after repairing; correct or adjust as necessary.														X	X	X	X	X					X
Prepare a conventional body and frame for straightening: a. remove damaged or necessary exterior and interior trim and moldings, b. remove damaged, non-structural body panels and components that may interfere with repair, c. remove repairable plastics and other parts that are recommended for off-car repair, d. remove all vehicle mechanical and electrical components that may interfere with or be damaged during repair; replace after repair, e. remove dirt, corrosion protection, under coatings, sealers and other protective coatings necessary to perform repairs to structural areas.														X	X	X	X	X					X
Demonstrate safe hook-up procedures for: a. mash, b. sidesway, c. sag, d. Diamond, e. twist.														X	X	X	X	X					X

Read and understand the manufacturer's product information for application of surface preparation materials.				X	X							X	X	X	X	X				X
Describe the products and procedures applicable to corrosion protection of closed body sections and exposed interior surfaces. Plan the correct step-by-step procedure for applying corrosion protection to closed body sections and exposed interior surfaces, using a planning checklist. Demonstrate the selection and application of a protective finish to a closed body section and an exposed interior surface.				X	X							X	X	X	X	X				X
Describe the products and procedures applicable to corrosion protection of exposed body panel joints. Plan the correct step-by-step procedure for completing the corrosion protection of exposed body panel joints, using a planning checklist. Demonstrate the selection and application of a protective finish to an exposed body panel joint.				X	X							X	X	X	X	X				X
Describe the products and procedures applicable to corrosion protection of exterior exposed surfaces. Plan the correct step-by-step procedure for completing the corrosion protection of exposed exterior surfaces, using a planning checklist. Select and apply the correct protective finish to an exterior exposed body surface.				X	X							X	X	X	X	X				X
Explain the importance of proper frame alignment in terms of effect upon alignment of sheet metal.				X	X							X	X	X	X	X				X
Describe how the procedures for front sheet metal replacement and alignment on a unibody frame design differ from the procedures used on a conventional body design. Describe how to replace and align the core support in frame and unibody vehicles. Explain the function of the core support. Check and adjust clearance of front fenders, headers, and other panels.				X	X							X	X	X	X	X				X
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Remove, replace and align: a. hood, hood hinges, and hood latch, b. deck lid, lid hinges, and lid latch, c. tailgates, hatches, lift gates, latches assemblies and hinges.											X	X	X	X	X	X				X
Check door hinge condition; check door frames for proper fit; check and adjust door clearances (where adjustable) along quarter panel, door, rocker panel, fender, and top with sedan and hard-top doors on a conventional and a unibody automobile.											X	X	X	X	X	X				X
Replace and align: a. front sheet metal assembly in a unibody constructed type of automobile, b. front sheet metal assembly on a conventional framed type of automobile											X	X	X	X	X	X				X
Remove, replace, and align bumpers, reinforcements, guards, isolators, and mounting hardware. Demonstrate safe procedures for removal of bumper energy absorbing devices and explain the safety precautions to be observed. Overhaul front and rear bumper assemblies.											X	X	X	X	X	X				X

Demonstrate all safety precautions pertaining to the use of cutting equipment. Explain how a panel should be cut. Demonstrate the removal of a damaged panel.															X	X	X	X	X					X
Demonstrate the procedures used in preparing inner structures for installing a new panel. Remove and replace all components necessary to install a panel.															X	X	X	X	X					X
Determine the extent of damage to aluminum body panels; repair, weld or replace in accordance with manufacturers' specifications.															X	X	X	X	X					X
Braze body panels only in locations recommended by vehicle manufacturer.																								X
Remove and replace welded steel panel or panel assembly. Cut out damaged sections of sheet steel body panels and weld in replacements according to vehicle and industry specifications. Install at least one of the following panels: a. door panel, b. rocker panel, c. rear body panel, d. quarter panel.															X	X	X	X	X					X
Repair or replace door skins and intrusion beams in accordance with vehicle manufacturers' specification.															X	X	X	X	X					X
Weld cracked or torn steel body panels; reweld broken welds.																				X				X
Identify and explain the five wheel alignment angles. Inspect and adjust (where applicable) steering linkage geometry (attitude/parallelism).																				X				X
Perform front end and four wheel alignment on suspension systems.																				X				X
Identify the following suspension systems and the major components of each of the suspension systems: a. upper coil (unitized body), b. lower coil (conventional), c. torsion bar (any Chrysler product), d. straight axle (pickup), e. McPherson strut suspension.																				X				X
Identify suspension system fasteners which should not be reused.																				X				X

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Disassemble and reassemble the following suspension systems: a. upper coil (unitized body), b. lower coil (conventional), c. torsion bar (any Chrysler product), d. straight axle (pickup), e. McPherson strut suspension.																	X							X
Remove and replace upper and lower control arms and control arm bushings, shafts, and rebound bumpers.																	X							X
Remove and replace strut rods and bushings on long and short arm suspension systems.																	X							X
Remove and replace upper and lower ball joints on short and long arm suspension systems.																	X							X
Remove and replace steering knuckle/spindle assemblies.																	X							X
Remove and replace front suspension system coil springs and spring insulators (silencers)																	X							X

Inspect, replace, and adjust front suspension system torsion bars; inspect mounts.																		X			X
Inspect and replace stabilizer bar bushings, brackets, and links.																		X			X
Inspect and replace McPherson strut cartridge or assembly, upper bearing, and mount.																		X			X
Remove and replace rear suspension system coil springs and spring insulators (silencers).																		X			X
Inspect, remove and replace rear suspension system transverse links, control arms, stabilizer bars, bushing and mounts.																		X			X
Inspect, remove and replace rear suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings and mounts.																		X			X
Demonstrate procedures for checking shock absorbers. Remove and replace shock absorbers. Inspect and replace air shock absorbers, load-leveling devices, air springs, and associated lines and fittings. Diagnose, inspect, adjust, repair or replace components of electronically-controlled suspension systems.																		X			X
Identify and explain the operation of a conventional steering system.																		X			X
Remove and replace power steering gear (non-rack and pinion type).																		X			X
Identify and explain the operation of a rack and pinion steering system.																		X			X
Remove and replace power rack and pinion steering gear; inspect and replace mounting bushings and brackets, ensure proper mounting location. Inspect and replace rack and pinion steering gear - inner tie rod ends (sockets), and bellows boots.																		X			X
Inspect, adjust tension and alignment, and replace power steering pump belt(s).																		X			X
Explain the function, difference, and operation of conventional and rack and pinion power steering.																		X			X

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Perform the following preliminary power steering checks: a. fluid level, b. belt tension, c. hose leaks, d. hose kinks e. inspect all steering linkage, f. check tires for equal size and inflation, g. check tire wear patterns for out of alignment, h. purge the system for trapped air, i. list the procedure for checking power steering.																	X			X
Remove and replace power steering pump; inspect pump mounts.																	X			X
Inspect and replace power steering hoses and fittings.																	X			X
Identify and explain the operation of a four-wheel steering system.																	X			X
Install steering linkage parts.																	X			X
Inspect and replace pitman arm, relay (center link/intermediate) rod, idler arm and mounting.																	X			X

Remove, replace, and adjust tie rods, tie rod sleeves, clamps, and tie rod ends (sockets).																			X			X
Remove and replace steering linkage damper.																			X			X
Inspect and replace steering shaft U-joint(s), flexible coupling(s), collapsible columns, and steering wheels.																			X			X
Demonstrate the procedures used in replacing and adjusting collapsible steering columns.																			X			X
Remove and replace steering wheels and turn signal switches. Remove and replace ignition locks.																			X			X
Adjust mask jackets and gear selector levers.																			X			X
Rotate tires according to manufacturers' recommendations.																			X			X
Diagnose tire pull (lead) problems; determine corrective actions.																			X			X
Perform wheel balancing. Balance wheel and tire assembly (static and/or dynamic).																			X			X
Describe and demonstrate the selection and use of terminals, splices, and related tools including a discussion of size, color, insulation and length of connection. Solder electrical wiring.																			X			X
Interpret and use a schematic diagram and color code.																			X			X
Identify programmable electrical/electronic components; record date for programming before disconnecting battery.																			X			X
Explain the basic operation of a battery. Explain the hazards of battery acid. Demonstrate cleaning, inspection, and replacement procedures for batteries. Perform battery state-of-charge test, determine needed service. Perform slow/fast battery charge in accordance with manufacturers' recommendation.																			X			X
Inspect, clean, and repair or replace battery cables, connectors, and clamps.																			X			X
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Inspect, adjust, and replace alternator drive belts, pulleys, and fans. Remove and replace alternator.																			X			X
Check voltages in electrical wiring circuits with a voltmeter; determine needed repairs.																			X			X
Check continuity and resistances in electrical wiring circuits and components with an ohmmeter; determine needed repairs.																			X			X
Check electrical wiring circuits with jumper wires; determine needed repairs.																			X			X
Inspect, test, and replace fusible links, circuit breakers, and fuses.																			X			X
Remove and replace headlights, parking/taillights, stoplights, flashers, turn-signals, and backup lights; check operation.																			X			X

Inspect, replace, and aim headlights/bulbs. Check operation of retractable headlight assembly. Demonstrate headlight adjustment on single headlights, dual headlights, and hideaway lights. Overhaul headlight assemblies.																			X			X
Remove and replace motors, switches, relays, connectors, and wires of retractable headlight assembly circuits.																			X			X
Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, and wires of all light circuits including four-wire taillight systems.																			X			X
Remove and replace horn(s); check operation.																			X			X
Check operation of windshield wiper/washer system.																			X			X
Check operation of electrically heated mirrors, windshields, backlights, panels, etc.; repair as necessary.																			X			X
Remove and replace components of power antenna circuits; check operation																			X			X
Check for serviceability of electric motors which are used in electric windows, seats, and mirrors.																			X			X
Troubleshoot failure of: a. fuel gauge, b. directional lights, c. stop and tail lights, d. headlights, e. horn, f. electric seats, windows, trunk latches, etc., g. dome lighting.																			X			X
Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports; replace brake lines (double flare and ISO types), hoses, fittings and supports.																			X			X
Inspect flexible brake hoses for leaks, kinks, cracks, bulging, or wear; tighten loose fittings and supports.																			X			X
Select, handle, store, and install brake fluids, (including silicone fluids).																			X			X
Bleed (manual, pressure, vacuum, or surge) and/or flush hydraulic brake system in accordance with manufacturers' procedures.																			X			X
Pressure test brake hydraulic system by applying heavy force to pedal, hold for 15 seconds and inspect for leaks.																			X			X
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Adjust brake shoes and reinstall brake drums or drum/hub assemblies and wheel bearings.																			X			X
Reinstall wheel, torque lug nuts, and make final checks and adjustments.																			X			X
Remove and replace caliper assembly.																			X			X
Clean and inspect caliper mounting and slides for wear and damage.																			X			X
Check parking brake system operation.																			X			X
Inspect, adjust, and replace A/C compressor drive belts and pulleys.																			X			X
Discharge A/C system of R-12.																			X			X
Flush A/C system components and hoses.																			X			X

Charge A/C system with R-12 (liquid or vapor); perform leak test.																				X			X
Inspect and correct oil level in A/C system.																				X			X
Describe the safety precautions to be followed when disconnecting pressure lines on an automotive air conditioner.																				X			X
Describe the dangers of moisture and air in a refrigeration system. (Seal all openings as soon as disconnected.)																				X			X
Remove and replace A/C compressor; inspect, repair or replace A/C compressor mounting.																				X			X
Inspect, repair or replace A/C system mufflers, hoses, lines, fittings, and seals.																				X			X
Inspect A/C condenser for air flow restrictions; clean and straighten fins.																				X			X
Inspect, test, and replace A/C system condenser and mounting.																				X			X
Inspect and replace receiver/drier or accumulator/drier.																				X			X
Inspect, test and replace evaporator.																				X			X
Inspect and repair evaporator housing water drain.																				X			X
Inspect, test, repair or replace heating, ventilating, and A/C vacuum components.																				X			X
Inspect and repair A/C component wiring.																				X			X
Inspect, test, and repair heating, ventilating, and A/C ducts, doors, hoses, and outlets.																				X			X
Inspect, flush, and replace heater core.																				X			X
List the three major purposes of an engine cooling system. Explain how a "closed cooling system" differs from a conventional cooling system.																				X			X
Identify and describe the function of following engine cooling system parts: a. radiator, b. pressure cap, c. water pump, d. thermostat.																				X			X
Describe causes for radiator overheating. Test for radiator leaks while radiator is mounted in the car.																				X			X
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Check for radiator leaks using test tank. Disassemble and assemble radiator parts. Perform minor radiator repairs. Block off tubes. Recore radiators.																				X			X
Inspect and replace engine cooling and heater system hoses and belts.																				X			X
Inspect, remove, and replace radiator, pressure cap, coolant recovery system, water pump and thermostat, by-pass and housing.																				X			X
Drain, flush, and refill system with proper coolant and level of protection.																				X			X
Remove and replace fan, fan clutch (both electrical and mechanical), and fan shroud.																				X			X
Inspect, remove, and replace auxiliary oil coolers.																				X			X

Remove and replace shift or clutch linkage as required.																				X			X
Remove and replace cables or linkages for throttle valve (TV), kickdown, and accelerator pedal.																				X			X
Remove and replace electronic sensors, wires, and connectors.																				X			X
Remove and replace power train assembly inspect, replace, and align power train mounts.																				X			X
Remove and replace rear axle assembly.																				X			X
Measure and/or adjust half shaft position/angle.																				X			X
Remove, inspect, and replace front-drive half shafts and axle knuckles.																				X			X
Remove, inspect, and replace exhaust manifold, manifold heat control valves (heat risers), exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields.																				X			X
Remove, inspect, and replace gas tank, gas tank filter, and gas cap; inspect and replace fuel lines and hoses; check fuel for contaminants.																				X			X
Remove and replace or remove and install fuel tanks, sending units, fuel line, and pollution control equipment.																				X			X
Remove, inspect, and replace liquid/vapor separator, liquid check valve, lines, and hoses of fuel vapor control systems.																				X			X
Remove, inspect and replace canister, filter, and purge lines of fuel vapor control systems.																				X			X
Remove, inspect, and replace pump, pressure relief valve, filter, pulley, and belt of pump-type air injection systems.																				X			X
Remove, inspect, and replace hoses, check valves, air manifolds, and nozzles of pump-type air injection systems.																				X			X
Remove, inspect, and replace pulse air valve(s) and hoses of exhaust pulse-type air injection systems.																				X			X
Remove, inspect, and replace heat stove shroud, hot air pipe, and damper of inlet air temperature control systems.																				X			X
Assessment of Intended Student Learning Competancies	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I			
Verify proper operation of active restraint seatbelt and shoulder harness system in accordance with manufacturers' procedures. Remove and replace seatbelt and shoulder harness assembly in accordance with manufacturers' procedures. Inspect anchorage for deformation; repair as required.											X									X			X
Verify proper operation of passive restraint seatbelt and shoulder harness system in accordance with manufacturers' procedures. Remove and replace seatbelt and shoulder harness assembly in accordance with manufacturers' procedures. Inspect anchorages for deformation; repair as required.											X									X			X

Remove and replace track and drive assembly, lap retractor, torso retractor assembly, inboard buckle-lap retractor, knee blocker, etc..													X						X			X
Use fault codes to diagnose and repair airbag system.													X						X			X
Disarm airbag system in accordance with manufacturers' procedures.													X						X			X
Inspect and replace damaged sensors and wiring in accordance with manufacturers' procedures; insure proper sensor orientation.													X						X			X
Replace deployed airbag modules in accordance with manufacturers' procedures.													X						X			X
Verify that system is armed and operational in accordance with manufacturers' procedures.													X						X			X
Remove and replace non-deployed airbag; observe manufacturers' safety procedures.													X						X			X
Demonstrate and explain the use of: a. epoxy resin, b. polyester resin, c. fiberglass cloth, d. mill fiber, e. chopped glass, f. catalyst, g. acetone, h. plastic filler.																			X			X
Diagnose fiberglass damage and determine the materials and techniques to be used. Repair cosmetic damage. Repair both accessible and inaccessible minor fiberglass structural damage. Fabricate for patching. Demonstrate clean-up and preparation for paint application.																			X			X
Observe all safety rules pertaining to the use of fiberglass.																			X			X
Demonstrate and explain the use of: a. fiberglass matting, b. roving, c. gel coating, d. P.V.A.																			X			X
Repair both accessible and inaccessible major fiberglass structural damage. Fabricate for patching. Demonstrate clean-up and preparation for paint application.																			X			X
Identify the types of plastics to be repaired. Demonstrate proper procedures for identification of plastics to be repaired: a. identify by symbol, b. identify by weld test.																			X			X
Identify the types of plastic repair procedures.																			X			X
Discuss the safety, care, and use of welding equipment and materials used for plastic repair.																			X			X
Assessment of Intended Student Learning Competancies	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I		
Repair rigid plastic parts with: a. hot air welding, b. airless welding, c. urethane or epoxy adhesives, d. urethane or epoxy adhesives and fiberglass reinforcements.																			X			X
Repair flexible plastic parts with: a. airless welding, b. urethane or epoxy adhesives, c. urethane or epoxy adhesives and fiberglass reinforcements.																			X			X
Repair holes and cuts in rigid and flexible plastic parts using backing materials and adhesives.																			X			X

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Assessment of Intended Student Learning Outcomes Standards

Standard 1 - Written Communication	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I
Outcome 1.1 - Use writing to discover and articulate ideas.	3	2	2	2	1	3	2	2	2	1	3	2	2	2	1	2	2	2	3	2
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.4 - Gather information and document sources appropriately.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.8 - Demonstrate proficiency in revision and editing.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3
Outcome 1.9 - Develop a personal voice in written communication.	3	2	2	2	1	3	2	2	2	1	2	2	2	2	1	2	2	2	3	3

Standard 2 - Quantitative Reasoning	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP	ABRP
	20E	20F	20G	20H	20I	22E	22F	22G	22H	22I	40E	40F	40G	40H	40I	41E	41F	41G	41H	41I
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	3	2	2	2	3	3	2	3	3	3	1	3	3	3	3	2	3	2	3	3
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	3	2	2	2	3	3	2	3	3	3	1	3	3	3	3	2	3	2	3	3
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	3	2	2	2	3	3	2	3	3	3	1	3	3	3	3	2	3	2	3	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	3	2	2	2	3	3	2	3	3	3	1	3	3	3	3	2	3	2	3	3
Outcome 2.6 - Assess the validity of statistical conclusions.	3	2	2	2	3	3	2	3	3	3	1	3	3	3	3	2	3	2	3	3

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Standard 1 - Written Communication	ABRP	ABRP	ABRP	ABRP	ABRP
	44E	44F	44G	44H	44I
Outcome 1.1 - Use writing to discover and articulate ideas.	3	3	3	3	3
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	3	3	3	3	3
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	3	3	3	3	3
Outcome 1.4 - Gather information and document sources appropriately.	3	3	3	3	3
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	3	3	3	3	3
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	3	3	3	3	3
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	3	3	3	3	3
Outcome 1.8 - Demonstrate proficiency in revision and editing.	3	3	3	3	3
Outcome 1.9 - Develop a personal voice in written communication.	3	3	3	3	3

Standard 2 - Quantitative Reasoning	ABRP	ABRP	ABRP	ABRP	ABRP
	44E	44F	44G	44H	44I
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	3	3	3	3	3
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	3	3	3	3	3
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	3	3	3	3	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	1	1	1	1	1
Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	3	3	3	3	3
Outcome 2.6 - Assess the validity of statistical conclusions.	3	3	3	3	3

Standard 3 - Information Retrieval and Technology	ABRP	ABRP	ABRP	ABRP	ABRP
	44E	44F	44G	44H	44I
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	3	3	3	3	3
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	3	3	3	3	3
Outcome 3.3 - Recognize, identify, and define an information need.	3	3	3	3	3
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	3	3	3	3	3
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	1	1	1	1	1
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	3	3	3	3	3

Standard 4 - Oral Communication	ABRP	ABRP	ABRP	ABRP	ABRP
	44E	44F	44G	44H	44I
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	3	3	3	3	3
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	3	3	3	3	3
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	3	3	3	3	3
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	3	3	3	3	3
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	3	3	3	3	3
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	3	3	3	3	3

Standard 5 - Critical Thinking	ABRP	ABRP	ABRP	ABRP	ABRP
	44E	44F	44G	44H	44I
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	3	3	3	3	3
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	3	3	3	3	3
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	3	3	3	3	3
Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	3	3	3	3	3
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	3	3	3	3	3
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	3	3	3	3	3
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	3	3	3	3	3
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	3	3	3	3	3
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	3	3	3	3	3