I  INTRODUCTION

A. Skill development in multi-stage refinishing techniques. Further development in identification of problems and solutions in color matching and partial panel refinishing.

B. Advanced Refinishing I (ABDR 2449) is a required course for the completion of a two year Associate of Applied Science degree in Auto Collision Repair or a Level I or Level II certificate of completion in the Auto Collision Technician Program.

C. This course is occupationally related and serves as a preparation for a career in the Auto Collision Repair field.

D. Prerequisites: This course has a prerequisite of ABDR 1419 and ABDR 1431 or consent of the Dept. Chair.

E. Alphanumeric coding used throughout this module book denotes integration of SCANS occupational competencies (C1, etc.) and Foundation skills (F1, etc.).

II  LEARNING OUTCOMES

Upon successful completion of this course, Advanced Refinishing I, the student will:

A. The student will mix and spray multi-stage paint systems. (C18, 19)

B. Identify paint problems and their prevention and solutions. (F9)

C. Select the proper undercoat and color system needed for repair. (C18, 19)

D. Repair and refinish complete and sectional panels including two-toning procedures. (C18, 19)

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E. Adjust painting variables to change the appearance of sprayed metallic colors.  
   (C18, 19) (F9)

F. Properly tint metallic and standard colors for the blending of spot and panel 
   repairs. (C18, 19) (F9)

G. Perform satisfactory spot repairs on single stage and base coat/clear metallic 
   finishes. (C18, 19)

H. Properly prepare and refinish a complete vehicle with a metallic base coat/clear 
   coat finish. (C18,19)

I. Describe the proper materials and techniques needed for specific plastic 
   refinishing requirements. (C, 18, 19)

J. Perform satisfactory retexturing and refinishing repairs to vinyl materials as well 
   as exterior and interior plastic parts. (C18, 19)

K. Perform all color sanding, compounding, clean-up, and detailing operations to the 
   vehicle necessary for customer delivery. (C18, 19)

L. Practice shop safety and properly use and maintain tools and equipment. (C20)

M. Use or prepare a budget, make forecasts, keep records and make adjustments to 
   meet objectives. (C2)

N. Create new ideas. (F7)

O. Perform color matching operations. (C5, 6, 7, 18, 19, 20) (F1, 9, 10)

P. Perform refinishing estimating operations. (C2)

III INSTRUCTIONAL MATERIALS

A. Text:

   The instructional materials identified for this course are viewable through 
   www.ctcd.edu/books

B. Supplemental Reading: As assigned by the instructor.

C. References: As selected by the instructor.

D. Audio Visual aids: (Recommended)
1. “Painted Accent Strips,” Hoffman #4.6F (Filmstrip)
2. “Vinyl Tape Accent Stripes,” Hoffman #4.6G (Filmstrip)

E. Other instructional material: as selected by the instructor.

IV COURSE REQUIREMENTS

A. Your first responsibility is scholarship. The grade you receive will be the result of your efforts both in the classroom and in the laboratory.

B. This course is designed to require a steady, continuous effort form the student. Class participation, initiative, attendance and work efforts will be considered in grade computation.

C. Reading and study assignments will be made by the instructor. Reading of all study assignments is required, as well as specific tasks outlined by the instructor or listed on handouts, or laboratory activity sheets. Specific reading assignments will be assigned by the instructor. Students are required to complete these assignments by the time specified by the instructor. Quizzes may be given on any or all reading assignments.

D. The study of a subject is not limited to the classroom, laboratory, or limits of the syllabus. Each student should seek out and study all available material available on the subject being taught. This might include use of the Internet or the library. In general, two hours of study outside the regular class period is recommended for each hour of classroom work.

E. Students are required to attend class and laboratory sessions regularly. Those who fail to do so may be dropped from the course with a grade of “FN”.

F. Students are required to be present for all examinations. See paragraph V (Examinations) for additional information.

G. Laboratory learning activities (lab tasks) will be completed on an individual basis except when limited by tools and/or materials. Learning activities will be subjectively graded by the instructor. Students assigned to a group must be present at all times when the project is being worked on. Students who are not present while a learning activity is in progress may be given a “0” for that activity. Students are required to complete all laboratory assignments by the time specified by the instructor.

V EXAMINATIONS
A. There will be a minimum of three major examinations:

1. Three Week Exam
2. Mid Term Exam
3. Final Exam (this is a comprehensive exam)
4. Additional examinations may be given if the instructor determines it is necessary for proper evaluation of the students in the class.

B. Students must be present for all examinations. Make up examinations will not be given. Students who know they will be absent on the day of an examination must make arrangements with the instructor prior to the absence. Students who are absent on the day of the examination due to illness or other extenuating circumstances must present to the instructor an acceptable reason for the absence on the day following the absence.

C. Students without an excused absence will be given a zero for that examination.

D. Students must take the final examination to receive a grade for the course.

VI SEMESTER GRADE COMPUTATIONS

A. Written examinations will count 45% of the student’s overall final grade.

B. Practical, hands-on lab work will count 45% of the student’s overall final grade.

C. Incentive points will count 10% of the student’s overall final grade. Incentive points are earned by doing additional work, written assignments, class participation, demonstrated initiative and positive attitude. Points will be deducted for each unexcused absence, each written assignment not turned in, each tardiness and each failure to secure tools and clean work areas.

D. Grade Computations (Example)

1. Written Exams (45%) (maximum 100 points)
   
   1st Exam  90
   2nd Exam  90
   3rd Exam  +90
   \[
   \frac{270}{3} = 90 \quad \text{average}
   \]

2. Lab score (45%) (maximum 100 points)
   
   Lab score = 80
45% of 80 = 36 points for lab score

3. Incentive Score (10%) (maximum 100 points)
   Incentive score = 82
   10% of 82 = 8.2 points for Incentive Score

4. Final Overall Grade Computation
   Written Exam  40.5 Points
   Lab Score  36.0 Points
   Incentive Score  8.2 Points
   84.7 Total Points = a letter grade of “B”

E. Points/Score Equivalents:

<table>
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<th>POINTS</th>
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<th>POINTS PER SEMESTER HOUR</th>
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<td>70-79</td>
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</table>

VII NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Course Withdrawal: It is the student’s responsibility to officially withdraw from a course if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file a Central Texas College Application for Withdrawal (CTC Form 59). The withdrawal form must be signed by the student.

CTC Form 59 will be accepted at any time prior to Friday of the 12th week of classes during the 16-week fall and spring semester. The deadline for sessions of other lengths is:

- 10-week session       Friday of the 8th week
- 8-week session        Friday of the 6th week
- 5-week session        Friday of the 4th week

The equivalent date (75% of the semester) will be sued for session of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

A student who officially withdraws will be awarded the grade of “W” provided the student’s attendance and academic performance are satisfactory at the time of
official withdrawal. Students must file a withdrawal application with the College before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of “F” or “FN” for nonattendance.

B. **Administrative Withdrawal**: An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on CTC Form 59 for submission to the registrar.

C. **Incomplete Grade**: The College catalog states, “An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course...” Prior approval from the instructor is required before the grade of “I” for Incomplete is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an “F” for the course.

D. **Cellular Phones and Beepers**: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

E. **American’s With Disabilities Act (ADA)**: Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. **Instructor Discretion**: The instructor reserves the right of final decision in course requirements.

G. **Civility**: Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

H. Absence from the class may be unavoidable in some situations. These include illness, military/civilian job requirements, or a death in the immediate family. Documentation is required in the case of excused absences for job requirement’s, excuses will be on company letterhead stationary signed by the immediate supervisor stating the reason for the absence for civilian jobs. Excuses for military personnel must be signed by the 1st Sergeant or the Company
Commander. In cases of illness, one day absences may be excused on a statement from the individual stating the reason. For more than one day of illness, the individual must have a statement from the doctor treating the illness.

VIII COURSE OUTLINE

A. Lesson One: Tinting and color Matching Metallics

1. Learning Outcomes: Upon successful completion of this lesson, the student will:
   a. The student will mix and spray multi-stage paint systems. (C18, 19)
   b. Identify paint problems and their prevention and solutions. (F9)
   c. Select the proper undercoat and color system needed for repair. (C18, 19)
   d. Repair and refinish complete and sectional panels including two-toning procedures. (C18, 19)
   e. Properly tint metallic and standard colors for the blending of spot and panel repairs. (C18, 19) (F9)
   f. Practice shop safety and properly use and maintain tools and equipment. (C20)
   g. Use or prepare a budget, make forecasts, keep records and make adjustments to meet objectives. (C2)
   h. Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18, 19)

2. Learning Activities:
   a. The student will complete reading assignments as assigned. (F1, F11, C5, C6)
   b. The student will study the words/terms and complete written assignments specified by the instructor. (F1, F11, C5, C6)
   c. The student will attend classroom lectures and participate in classroom discussion. (F5 thru 7, F9, F10, C1, C5 thru 7)
   d. The student will observe demonstrations performed by the instructor. (F5, F10, C5, C6, C14)
   e. The student will complete laboratory learning activities assigned by the instructor. See the laboratory learning activity list attached. (F1 thru F17, C1, C3, C5 thru 9, C14 thru 16, C18 thru 20)

3. Equipment and Materials:
   a. Surface preparation tools and materials
b. Masking materials
c. Selection of acrylic lacquer and enamel systems
d. Selections of tinting colors (as needed for colors to be tinted)
e. Selections of grades and types of metallic flake
f. Tinting kits and guides
g. Spray-out panels
h. Production spray guns

4. Audio Visual Aids: (Recommended)
   a. To be selected by the instructor from those listed in Section III D above.
   b. Others as selected by the instructor.

5. Lesson Outline:
   a. Metallic Color Shades
      (1) Construction of metallic color
      (2) OEM standard shade
         (a) Factors affecting uniformity between vehicles
             (i) Types of topcoat
             (ii) Methods of application
             (iii) Different plant locations
             (iv) Experience and training
         (b) Need for color matching
      (3) Dispersion of flake and pigment
         (a) Standard shade
         (b) Light shade
         (c) Dark shade
      (4) Variables affecting shades
         (a) Thinner/reducer evaporation rate
         (b) Ratio of reduction/thinning
         (c) Atomizing air pressure
         (d) Wetness of application
         (e) Spray techniques
      (5) Procedures for shade matching
         (a) Acrylic lacquer
         (b) Acrylic enamel
   b. Tinting for Blending
      (1) Purpose for tinting
      (2) Basic color
         (a) Primary colors
         (b) Secondary colors
         (c) Absorption and reflectance
      (3) Tinting terminology
(a) Depth - lightness/darkness
(b) Cast - Color shift
(c) Clarity - grayness/brightness
(d) Flop
(e) Face color
(f) Pitch color

(4) Behavior of tinting colors
(a) Cast shifts
   (i) Red/green
   (ii) Yellow/blue
   (iii) Yellow/red
   (iv) Blue/green
(b) Colors affected
(c) Effect of clear application
(d) Adjusting clarity
   (i) Whites
   (ii) Blacks
   (iii) Factors affecting depth
(e) Strength of toners

(5) Behavior of metallics
(a) Sizes
   (i) Fine
   (ii) Medium
   (iii) Coarse
   (iv) Extra Coarse
   (v) “Metalflake”
   (vi) Factors affecting flop
   (vii) Factors affecting brightness
   (viii) Factors affecting pitch color
(b) Colors
   (i) Silver
   (ii) Gold
   (iii) Multi-color
   (iv) Mica
(c) Polish
   (i) Single side (domestic)
   (ii) Double side (imports)
   (iii) Factors affecting brightness

(6) Effect drying
(7) Use of tinting kits and guides
(8) Tinting procedures
(a) Selection of base color
(b) Comparison of vehicle to base color
(c) Determine the need to tint
(d) Adjust depth
(e) Adjust cast
(f) Adjust for clarity
(g) Adjust for pitch
(9) Use of spray-out test panels
B. **Lesson Two: Spot Repair**

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:

   A. The student will mix and spray multi-stage paint systems. (C18, 19)
   B. Identify paint problems and their prevention and solutions. (F9)
   C. Select the proper undercoat and color system needed for repair. (C18, 19)
   D. Repair and refinish complete and sectional panels including two-toning procedures. (C18, 19)
   E. Properly tint metallic and standard colors for the blending of spot and panel repairs. (C18, 19) (F9)
   F. Perform satisfactory spot repairs on single stage and base coat/clear metallic finishes. (C18, 19)
   G. Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18, 19)
   H. Practice shop safety and properly use and maintain tools and equipment. (C20)
   I. Create new ideas. (F7)
   J. Perform color matching operations. (C5, 6, 7, 18, 19, 20) (F1, 9, 10)

2. **Learning Activities:**

   a. The student will complete reading assignments as assigned. (F1, F11, C5, C6)
   b. The student will study the words/terms and complete written assignments specified by the instructor. (F1, F11, C5, C6)
   c. The student will attend classroom lectures and participate in classroom discussion. (F5 thru 7, F9, F10, C1, C5 thru 7)
   d. The student will observe demonstrations performed by the instructor. (F5, F10, C5, C6, C14)
   e. The student will complete laboratory learning activities assigned by the instructor. See the laboratory learning activity list attached. (F1 thru F17, C1, C3, C5 thru 9, C14 thru 16, C18 thru 20)

3. **Equipment and Materials:**

   a. Surface preparation materials and tools
   b. Masking materials
c. Selection of acrylic lacquer and enamel systems
   (1) Primers and surfacers
   (2) Sealers
   (3) Thinners and reducers
   (4) Catalysts
   (5) Clears

d. Hand and machine rubbing compounds
e. Production spray guns
f. Body panels for student practice

4. Audio Visual Aids: (Recommended)

a. To be selected by the instructor from those listed in Section III D above.
b. Others as selected by the instructor.

5. Lesson Outline:

a. Characteristics of Successful Repairs
b. Surface preparation
   (1) Cleaning
   (2) Featheredging
   (3) Application of undercoats
   (4) Block and final sanding
   (5) Adhesion compounding of repair area
c. Procedures
   (1) Color preparation
   (2) Mist coat materials
   (3) Gun and air adjustments
   (4) Use of test panels
   (5) Application sequence and flash time
   (6) Mist coating
   (7) Metallic color match correction
   (8) Film thickness
   (9) Cure times
   (10) Color sanding
   (11) Compounding for gloss
d. Application Procedures
   (1) Acrylic lacquer
   (2) Acrylic enamel
   (3) Base coat/clear coat
      (a) Lacquer
      (b) Enamel
e. Touch-up Repairs
   (1) Acrylic lacquer
   (2) Acrylic enamel
   (3) Base coat/clear coat
       (a) Lacquer
       (b) Enamel

C. **Lesson Three:** Panel Repair

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will:

   a. The student will mix and spray multi-stage paint systems. (C18, 19)
   b. Identify paint problems and their prevention and solutions. (F9)
   c. Select the proper undercoat and color system needed for repair. (C18, 19)
   d. Repair and refinish complete and sectional panels including two-toning procedures. (C18, 19)
   e. Properly tint metallic and standard colors for the blending of spot and panel repairs. (C18, 19) (F9)
   f. Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18, 19)
   g. Practice shop safety and properly use and maintain tools and equipment. (C20)

2. **Learning Activities:**

   a. The student will complete reading assignments as assigned. (F1, F11, C5, C6)
   b. The student will study the words/terms and complete written assignments specified by the instructor. (F1, F11, C5, C6)
   c. The student will attend classroom lectures and participate in classroom discussion. (F5 thru 7, F9, F10, C1, C5 thru 7)
   d. The student will observe demonstrations performed by the instructor. (F5, F10, C5, C6, C14)
   e. The student will complete laboratory learning activities assigned by the instructor. See the laboratory learning activity list attached. (F1 thru F17, C1, C3, C5 thru 9, C14 thru 16, C18 thru 20)

3. **Equipment and Materials:**

   a. Surface preparation material and tools
   b. Masking materials
c. Selections of acrylic enamel and lacquer systems
   (1) Primers and surfacers
   (2) Sealers
   (3) Thinners and reducers
   (4) Acrylic enamel catalysts
   (5) Clears
d. Production spray guns
e. Body panels for student use

4. Audio Visual Aids: (Recommended)
   a. To be selected by the instructor from those listed in Section III D above.
   b. Others as selected by the instructor.

5. Lesson Outline:
   a. Panel Analysis
      (1) Type of substrate/finish system
      (2) Problem conditions dictating repair
      (3) Selection of refinish system
   b. Types of Panel Repair
      (1) Complete panel
         (a) Damage original
         (b) Replacement service panel
      (2) Panel section
         (a) Crease break
         (b) Moulding break
         (c) Stripe or two-tone break
      (3) Purpose of repair types
   c. Importance of color accuracy
d. Refinishing Procedures
   (1) Surface preparation
      (a) Cleaning
      (b) Sanding
      1. Reduction of film thickness
      2. Grit usage
   (2) Masking
      (a) Complete panel
      (b) Panel section
      (c) Service panels
   (3) Undercoat selection and application
   (4) Color preparation and application
      (a) Acrylic lacquer
      (b) Catalyzed acrylic enamel
Adjacent panel blending
(a) Surface preparation
(b) Cleaning
(c) Masking

Base coat/clear coat
(1) Components
(a) Base coats
(b) Clears
(c) Catalysts
(d) Adhesion promoters
(2) Surface preparation
(3) Application of systems
(a) Lacquer base coat
   1. Lacquer clear
   2. Urethane clear
(b) Enamel base coat (catalyzed)
   1. Enamel clear
   2. Urethane clear

D. **Lesson Four**: Plastic and Vinyl Parts Refinishing

1. **Learning Outcomes**: Upon successful completion of this lesson, the student will:

   a. Identify paint problems and their prevention and solutions. (F9)
   b. Describe the proper materials and techniques needed for specific plastic refinishing requirements. (C, 18, 19)
   c. Perform satisfactory retexturing and refinishing repairs to vinyl materials as well as exterior and interior plastic parts. (C18, 19)
   d. Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18, 19)
   e. Practice shop safety and properly use and maintain tools and equipment. (C20)
   f. Perform color matching operations. (C5, 6, 7, 18, 19, 20) (F1, 9, 10)
   g. Use or prepare a budget, make forecasts, keep records and make adjustments to meet objectives. (C2)

2. **Learning Activities**:

   a. The student will complete reading assignments as assigned. (F1, F11, C5, C6)
   b. The student will study the words/terms and complete written assignments specified by the instructor. (F1, F11, C5, C6)
c. The student will attend classroom lectures and participate in classroom discussion. (F5 thru 7, F9, F10, C1, C5 thru 7)
d. The student will observe demonstrations performed by the instructor. (F5, F10, C5, C6, C14)
e. The student will complete laboratory learning activities assigned by the instructor. See the laboratory learning activity list attached. (F1 thru F17, C1, C3, C5 thru 9, C14 thru 16, C18 thru 20)

3. Equipment and Materials:
   a. Surface preparation materials and tools
   b. Masking materials
   c. Selections of acrylic lacquer and enamel systems
   d. Elastomeric compounds/flex agents
   e. Adhesion promoters
   f. Texture materials
   g. Flattening compounds
   h. Flexible primers and sealers
   i. Vinyl cleaners and conditioners
   j. Vinyl clears
   k. Interior and exterior vinyl colors
   l. Production spray guns

4. Audio Visual Aids: (Recommended)
   a. To be selected by the instructor from those listed in Section III D above.
   b. Others as selected by the instructor.

5. Lesson Outline:
   a. Types of Plastics-Identification/Location
      (1) Rigid ABS
      (2) Polypropylene
      (3) Vinyl (PVC) and flexible ABS
      (4) Ethylene propylene
      (5) Polycarbonate (Xenoy)
      (6) Polyurethane - thermoset/thermosplastic
      (7) Thermoplastic olefins
   b. Description and use of Special Materials
      (1) Elastomeric compounds/flex agents
      (2) Adhesion promoters for poly olefins
      (3) Texture materials
      (4) Flexible primers and sealers
      (5) Interior trim colors - lacquer and vinyl
(6) Flattening compounds
(7) Vinyl clears
(8) Vinyl top colors

c. Procedures and Techniques

(1) Interior parts and trims
   (a) Rigid ABS
   (b) PVC/ABS - Flexible
   (c) Polypropylene
   (d) PVC

(2) Exterior parts and trim
   (a) Ethylene propylene
   (b) Polycarbonate
   (c) Thermoset polyurethane
   (d) Thermoplastic polyurethane
   (e) PVC
   (f) Thermoplastic olefin

E. Lesson Five: Complete Vehicle Refinishing

1. Learning Outcomes: Upon successful completion of this lesson, the student will:
   a. The student will mix and spray multi-stage paint systems. (C18, 19)
   b. Identify paint problems and their prevention and solutions. (F9)
   c. Select the proper undercoat and color system needed for repair. (C18, 19)
   d. Repair and refinish complete and sectional panels including two-toning procedures. (C18, 19)
   e. Adjust painting variables to change the appearance of sprayed metallic colors. (C18, 19) (F9)
   f. Properly tint metallic and standard colors for the blending of spot and panel repairs. (C18, 19) (F9)
   g. Perform satisfactory spot repairs on single stage and base coat/clear metallic finishes. (C18, 19)
   h. Properly prepare and refinish a complete vehicle with a metallic base coat/clear coat finish. (C18, 19)
   i. Describe the proper materials and techniques needed for specific plastic refinishing requirements. (C, 18, 19)
   j. Perform satisfactory retexturing and refinishing repairs to vinyl materials as well as exterior and interior plastic parts. (C18, 19)
   k. Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18, 19)
1. Practice shop safety and properly use and maintain tools and equipment. (C20)

m. Perform color matching operations. (C5, 6, 7, 18, 19, 20) (F1, 9, 10)

n. Perform refinishing estimating operations. (C2)

o. Create new ideas. (F7)

2. Learning Activities:

a. The student will complete reading assignments as assigned. (F1, F11, C5, C6)

b. The student will study the words/terms and complete written assignments specified by the instructor. (F1, F11, C5, C6)

c. The student will attend classroom lectures and participate in classroom discussion. (F5 thru 7, F9, F10, C1, C5 thru 7)

d. The student will observe demonstrations performed by the instructor. (F5, F10, C5, C6, C14)

e. The student will complete laboratory learning activities assigned by the instructor. See the laboratory learning activity list attached. (F1 thru F17, C1, C3, C5 thru 9, C14 thru 16, C18 thru 20)

3. Equipment and Materials:

a. Estimate forms

b. Surface preparation materials and tools

c. Masking materials

d. Selection of acrylic enamel reducers and retarder

e. Primers and surfacers

f. Metallic acrylic enamel

g. Catalyst (optional)

h. Silicone additives

i. Tack rags

j. Production spray guns

k. Cleanup materials

4. Audio Visual Aids: (Recommended)

a. To be selected by the instructor from those listed in Section III D above.

b. Others as selected by the instructor.
5. Lesson Outline:

a. Estimating refinishing costs
   (1) Labor times
      (a) Section heading interpretation
      (b) included operations
      (c) Overlap
      (d) Added/deducted times
      (e) Panel painting
      (f) Spot painting
      (g) Overall refinishing
   (2) Material costs
      (a) Figuring straight cost
      (b) Use of materials guides
   (3) Special situations
b. Review of vehicle preparation
c. Paint booth preparation
d. Vehicle inspection
   (1) Missed flaws
   (2) Proper/complete masking
e. Color preparation
   (1) Mixing
      (a) Hand
      (b) Machine
   (2) Color reduction
      (a) Reducer/temperature
      (b) Reduction in quantity
      (c) Viscosity
   (3) Silicone additives
   (4) Catalyst
f. Spray equipment
   (1) Operation
   (2) Pattern testing
g. Final Vehicle clean-up
   (1) Prevention of static electricity build-up
   (2) Solvent wash
   (3) Blow and tack
h. Paint application
   (1) Hose control
   (2) Panel sequence
   (3) Panel procedures
      (a) Roof
      (b) Windshield pillars
      (c) Hood and fenders
      (d) Fender sides and wheel-opening flanges
(e) Doors and rocker panels
(f) Deck areas
(g) Quarter panel and valances

(4) Maintaining uniformity
(5) Determining wetness
(6) Number of coats
(7) Mist coating
   (a) Reasons for use
   (b) Cautions

(8) Cure times
  i. Unmasking
  j. Clean-up for customer delivery
Learning Outcome: Prepare a Budget. Assess skills and distribute work. Create new ideas.

Directions: This is a written assignment. It may be handwritten, typed or done on a computer. If handwritten, writing must be legible. This task must be completed prior to taking your final/exit exam for this course.

You work for an auto body shop. Your boss wants to bid on a contract to repaint ten (10) new company cars. All cars are the same make, model and color. The company wants the cars painted light green. You have been assigned to design a plan to accomplish this project.

1. Identify the individual tasks required to complete the project (prepare a list).
2. Draw an organizational chart that reflects the work flow for the project (stations) and the number of people at each station.
3. Select the people for each station (use fictitious names) and identify their job (prepare a list).
4. Determine the amount of material required for the project.
5. Calculate the total time required to complete the project based on an 8 hour workday.
6. Prepare a budget to accomplish this project. The following information is furnished:
   a. The cars are 1994 Buick Centurys.
   b. Paint is $42.63 per gallon.
   c. Reducer/thinner is $12.60 per gallon.
   d. Masking paper is $18.20 per roll.
   e. Tape is $4.60 per roll.
   f. Miscellaneous supply cost is $316.21.
   g. The time allotted to prepare and paint each car (work time) is eleven (11) hours. This does not include drying and cleaning time.
   h. The labor rate is $17.50 per hour for supervisors and $9.40 per hour for all others.

See your instructor if you have any questions.
Turn the assignment into your instructor and discuss it with him.
WORKSHEET
2449-02

Learning Outcome: Create New Ideas

Directions: This is a written assignment. It may be hand written, typed or done on a computer. If handwritten, writing must be legible. This task must be completed prior to taking your final/exit exam for this course.

You work for an auto body shop. You have been tasked to develop a new preventative maintenance program for the welding machines in the shop. This task consists of the following:

   a. Prepare a list of the welding machines in the shop.
   b. List the current PM schedule for each make and model of machine.
   c. Prepare a new PM schedule for each make and model of machine.
      1. List the machine.
      2. List the new PM interval and what is to be done to the machine during the PM check.
      3. Justify the new program (why is the new program better).

See your instructor if you have any questions.
Turn the assignment into your instructor and discuss it with him. Be prepared to defend your justification.
INSTRUCTIONS FOR ALL STUDENTS: Student texts, notes and service manuals may be used in performance of the tasks. The instructor must verify satisfactory completion of each task by entering the date and his initials in the date column for each task. The instructor will not verify satisfactory completion of the task until all standards have been met. The grade earned will be entered in the task# column.

To meet minimum requirements, the student must correctly complete each task listed below one time. Each performance exam will count 3.4 points. A maximum of 100 points will be awarded. NOTE: Failure to follow instructions, record required data, use correct tools in correct manner, clean work area, secure tools and equipment, absence, or unsafe act will result in a deduction of points from your total lab score.

<table>
<thead>
<tr>
<th>TASK #</th>
<th>LEARNING ACTIVITY DESCRIPTION</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Using the product use manuals, list in sequence the materials and products required to finish bare metal panels using&lt;br&gt;a. single stage finishes&lt;br&gt;b. two stage finishes&lt;br&gt;c. tri-coat finishes</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Outline in sequence, the procedures for finishing a panel with a:&lt;br&gt;a. single stage finish&lt;br&gt;b. two stage finish&lt;br&gt;c. tri-coat finish**This outline must include film thickness limits in mils and number of coats applied.</td>
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<tr>
<td>3.</td>
<td>A. Prepare and finish TWO panels in each of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. single stage finish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. two-tone finish with a painted stripe break line. (Student design)</td>
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</tr>
<tr>
<td></td>
<td>3. two stage finish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. tri-coat finish</td>
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<tr>
<td></td>
<td><strong>NOTE:</strong> Each pair of panels MUST be finished with the same paint material and preferably at the same spraying session.</td>
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<tr>
<td>B.</td>
<td>Record and retain the product information, variables and techniques used in each operation.</td>
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<tr>
<td>C.</td>
<td>Ask your instructor to damage one panel out of each pair.</td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td><strong>Protect and store</strong> each of the undamaged panels for use in other tasks.</td>
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</tr>
<tr>
<td>E.</td>
<td>Refinish each of the damaged panels using complete panel refinishing techniques.</td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td><strong>Protect and store</strong> each of the refinished panels for use in other tasks.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Obtain a practice panel and practice spot repair gun manipulation using water as the spray medium. Ask your instructor to check your technique. When your technique is satisfactory, practice again using paint as the spray medium. Have your instructor check your work.</td>
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<tr>
<td>5.</td>
<td>Have your instructor damage each of the REFINISHED panels produced in task 3 above.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Using the product manuals, prepare a list of materials required to spot repair each of the above panels.</td>
<td></td>
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<tr>
<td>7.</td>
<td>Perform spot repairs to panels finished in each of the following paint systems:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. single stage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. two stage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. tri-color</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The companion panels produced in task 3 above will serve as the color match gauge and blend panel for these repairs. <strong>PROTECT THEM!</strong> Have your instructor check your work at the end of each phase of each repair.</td>
<td></td>
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<tr>
<td>8.</td>
<td>Perform the following to one of the above panels using the proper materials and techniques.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. dirt repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. compound/polish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. finesse/polish</td>
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<tr>
<td>9.</td>
<td>Describe the theory of color and the ways in which it is viewed.</td>
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<tr>
<td>10.</td>
<td>List and define in detail the terms used to describe color.</td>
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</tbody>
</table>
11. Evaluate color shifts from examples provided by your instructor.

12. Describe in sequence the procedures required to tint and blend for color match.

13. Prepare and finish two panels in each of the following systems:
   a. single stage
   b. two stage
   c. tri-color

14. Have your instructor damage one of each type of panel. Repair, then tint and blend the repaired panel to its companion for an acceptable industry color match.

15. Prepare a list of fall materials, including quantities, required to refinish your lab vehicle. **NOTE: HVLP spray equipment will be used.

16. Clean and prepare the spray booth as required.

17. Prepare the paint mixing room and assemble all tools and supplies needed.

18. Prepare and refinish the assigned vehicle.

19. Clean and detail the vehicle for delivery.

20. Prepare a budget. Assess skills and distribute work. Complete Worksheet 2449-01. To be completed by the end of the course.

21. Identify the common plastics used in the manufacture of interior plastic parts.

22. Retexture and refinish a part made from each of the following plastics:
   a. rigid ABS
   b. Polypropylene
   c. polyvinyl chloride
   **NOTE: Outline the steps and materials required for each of the above procedures PRIOR to performing the exercise.

23. Define elastomeric finishes.

24. Describe the techniques and materials required for the refinishing of:
   a. vinyl roof coverings.
   b. thermoplastic olefins.
   c. polyurethanes.

25. Refinish a part made from the following plastics:
   a. PVC
   b. thermoplastic olefins.
   c. Polyurethane.
<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>26.</td>
<td>Write a complete and competitive refinish estimate on a vehicle assigned by your instructor.</td>
</tr>
<tr>
<td>27.</td>
<td>Prepare a bid to refinish a fleet of five pickup trucks for a municipality. Include material and labor costs as well as work schedules and completion dates.</td>
</tr>
<tr>
<td>28.</td>
<td>Properly and safely use and maintain tools and equipment and practice shop safety. Graded throughout the course.</td>
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<tr>
<td></td>
<td><strong>TOTAL POINTS/GRADE AWARDED (Possible 100 points)</strong></td>
</tr>
</tbody>
</table>
CENTRAL TEXAS COLLEGE
COMPETENCY PROFILE

<table>
<thead>
<tr>
<th>Program:</th>
<th>Auto Collision Repair Technician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course:</td>
<td>ABDR 2449 Advanced Refinishing</td>
</tr>
<tr>
<td></td>
<td>(144 clock hours)</td>
</tr>
<tr>
<td></td>
<td>(4 credits)</td>
</tr>
<tr>
<td>Entry Occupation:</td>
<td>Auto Body Repair Helper/Apprentice</td>
</tr>
<tr>
<td>Instructor:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>SSAN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Enrolled:</td>
<td>Date Completed/Withdraw:</td>
</tr>
<tr>
<td>Total Hours Absent:</td>
<td>Final Grade</td>
</tr>
</tbody>
</table>

RATING SYSTEM

The instructor will evaluate the student by placing a check mark in the appropriate number block to indicate the student's degree of competency. (Enter N/A if the item is not applicable or not observed.) The rating for each task reflects the instructor's evaluation of employability readiness rather than the grade given in the class. The final grade is not an average of ratings. The rating scale listed below will be used to rate the student.

RATING SCALE

1 = 95(A) = Mastered competency: Highly proficient. Can perform task without supervision. Can teach others. Meets or exceeds SCANS requirements.

2 = 85(B) = Mastered Competency: Proficient. Can perform task with limited supervision. Meets most SCANS requirements.

3 = 75(C) = Mastered Competency: Can perform task but requires close supervision. Meets minimum SCANS requirements.

4 = 0(F) = Did NOT master competency: Unable to or did not attempt to perform task. Does not meet SCANS requirements.
<table>
<thead>
<tr>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Outcome 1:</strong> The student will mix and spray multi-stage paint systems. (C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 2:</strong> Identify paint problems and their prevention and solutions. (F9)</td>
</tr>
<tr>
<td><strong>Learning Outcome 3:</strong> Select the proper undercoat and color system needed for repair. (C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 4:</strong> Repair and refinish complete and sectional panels including two-toning procedures.(C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 5:</strong> Adjust painting variables to change the appearance of sprayed metallic colors. (C18,19) (F9)</td>
</tr>
<tr>
<td><strong>Learning Outcome 6:</strong> Properly tint metallic and standard colors for the blending of spot and panel repairs. (C18,19) (F9)</td>
</tr>
<tr>
<td><strong>Learning Outcome 7:</strong> Perform satisfactory spot repairs on single stage and base coat/clear metallic finishes. (C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 8:</strong> Properly prepare and refinish a complete vehicle with a metallic base coat/clear coat finish.(C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 9:</strong> Describe the proper materials and techniques needed for specific plastic refinishing requirements. (C,18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 10:</strong> Perform satisfactory retexturing and refinishing repairs to vinyl materials as well as exterior and interior plastic parts. (C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 11:</strong> Perform all color sanding, compounding, clean-up and detailing operations to the vehicle necessary for customer delivery. (C18,19)</td>
</tr>
<tr>
<td><strong>Learning Outcome 12:</strong> Practice shop safety and properly use and maintain tools and equipment. (C20)</td>
</tr>
<tr>
<td><strong>Learning Outcome 13:</strong> Use or prepare a budget, make forecasts, keep records and make adjustments to meet objectives. (C2)</td>
</tr>
<tr>
<td><strong>Learning Outcome 14:</strong> Create new ideas. (F7)</td>
</tr>
<tr>
<td><strong>Learning Outcome 15:</strong> Perform color matching operations. (C5,6,718,19,20) (F1,9,10)</td>
</tr>
<tr>
<td><strong>Learning Outcome 16:</strong> Perform refinishing estimating operations. (C2)</td>
</tr>
</tbody>
</table>
Workplace Know-How and Personal Characteristics

The rating system listed below will be used by the Worksite Supervisor to evaluate the student’s workplace know-how and personal characteristics. The Worksite Supervisor will evaluate the student on the following competency (task) listed by circling the appropriate rating from the rating scale below that best describes his/her observation of the student during the entire length of this course for the rated area (task). Enter the date the task was completed in the date column.

**Rating Scale**

1 = Above Average  
2 = Average  
3 = Below Average  
N/A = Not Observed

<table>
<thead>
<tr>
<th>COMPETENCIES: Effective workers can productively use:</th>
<th>Rating</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources: allocating time, money, materials, space, staff.</td>
<td>1 2 3 N/A</td>
<td></td>
</tr>
<tr>
<td>Interpersonal Skills: working on teams, teaching others, serving customers, leading, negotiating and working well with people from culturally diverse backgrounds.</td>
<td>1 2 3 N/A</td>
<td></td>
</tr>
<tr>
<td>Information: acquiring and evaluating data, organizing and maintaining files, interpreting and communicating and using computers to process information.</td>
<td>1 2 3 N/A</td>
<td></td>
</tr>
<tr>
<td>Systems: understanding social, organizational, and technological systems, monitoring and correcting performance and designing or improving systems.</td>
<td>1 2 3 N/A</td>
<td></td>
</tr>
<tr>
<td>Technology: selecting equipment and tools, applying technology to specific tasks and maintaining and troubleshooting technologies.</td>
<td>1 2 3 N/A</td>
<td></td>
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</tbody>
</table>

THE FOUNDATION: Competence requires:

| Basic Skills: reading, writing, arithmetic and mathematics, speaking and listening. | 1 2 3 N/A |
| Thinking Skills: thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn and reasoning. | 1 2 3 N/A |
| Personal Qualities: individual responsibility, self-esteem, sociability, self-management and integrity. | 1 2 3 N/A |

PERSONAL CHARACTERISTICS

| Relations with others: Effectiveness in working with students, instructors and others; cooperation; shows respect. | 1 2 3 N/A |
**Dependability:** attendance; loyalty; punctuality; adherence to schedules and deadlines; consistency and results; perseverance.

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<th>2</th>
<th>3</th>
<th>N/A</th>
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</table>

**Work Attitudes:** willingness to learn; willingness to accept and profit from evaluation; enthusiasm; initiative; commitment; pride in work.

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<tr>
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<th>3</th>
<th>N/A</th>
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</table>

**Communication:** listening; speaking; and nonverbal skills; effectiveness in communicating with students, teachers and others.

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<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>N/A</th>
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</table>

**Personal Hygiene-Grooming:** personal health care and cleanliness, dresses and maintains self appropriately for a business environment.

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<tr>
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<th>2</th>
<th>3</th>
<th>N/A</th>
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</thead>
</table>

Based on my observation/evaluation of the student he/she has: (place a “\"\" in the appropriate block).

- Entry level skills now.
- Entry level skills after completing additional external learning experience.
- Entry level skills after completing additional course work.
- Entry level skills after completing additional course work and additional external learning experience.

**Instructor Comments:** (Please provide additional information regarding your evaluation of the student’s performance.)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**INSTRUCTOR CERTIFICATION**

I certify this competency profile to be true and accurate to the best of my knowledge.

Signature: ___________________________ Date: _________________________

I have seen this evaluation and discussed it with my Instructor.

Student Signature: ___________________________ Date: _________________________

**Written Exam**

<table>
<thead>
<tr>
<th>Final Score</th>
<th>First</th>
<th>Second</th>
<th>Final</th>
</tr>
</thead>
</table>

ABDR 2449