HIGHLAND COMMUNITY COLLEGE

Syllabus

ACR215 Non-Structural Analysis and Damage Repair III
4 Credit Hours (Lecture & Lab)
Prerequisites: ACR165
C & I Revision Date: 02/14/2025

Department:

Automotive Collision and Refinishing Technology

Course Description:

Through a variety of classroom and/or lab/shop learning and assessment activities, students in this course will: remove and install trim and hardware; determine process and procedures necessary for movable glass repair; repair outer body panel; replace and adjust outer body panels; remove and install mechanical and electrical components; demonstrate safety protocol appropriate for the auto repair setting; perform intermediate welding skills on non-structural damage repairs; and perform plastic and adhesive repairs..

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Postsecondary Technical Education Authority (TEA) for this course as approved by the Kansas Board of Regents.

Upon completion of the course, the student should be able to:

1. Remove trim and hardware
    a. Inspect, remove, store, and replace exterior trim and moldings. HP-I
    b. Inspect, remove, store, and replace interior trim and components. HP-I
    c. Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
2. Install trim and hardware
    a. Inspect, remove, store, and replace exterior trim and moldings. HP-I
    b. Inspect, remove, store, and replace interior trim and components. HP-I
    c. Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
3. Determine process and procedures necessary for movable glass repair
    a. Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
    b. Protect panels, glass, and parts adjacent to the repair area. HP-I
    c. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. HP-I
    d. Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. HP-G
    e. Inspect, repair or replace, and adjust removable, manually or power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. HP-G
4. Repair outer body panel
    a. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. HP-I

b. Determine the extent of damage to aluminum body panels; repair or replace. HP-G
c. Straighten and rough-out contours of damaged panels to a suitable condition for body filling or metal finishing using power tools, hand tools, and weld-on pull attachments. HP-I
d. Weld damaged or torn steel body panels; repair broken welds. HP-I
e. Restore corrosion protection. HP-I
f. Replace door skins. HP-G
g. Restore sound deadeners and foam materials. HP-I
h. Perform panel bonding. HP-G

5. Replace outer body panels
    a. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. HP-I
    b. Inspect, remove, replace, and align hood, hood hinges, and hood latch. HP-I
    c. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. HP-I
    d. Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. HP-I
    e. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. HP-I
    f. Inspect, remove, replace and align front fenders, headers, and other panels. HP-I
    g. Diagnose and repair water leaks, dust leaks, and wind noise. HP-G
6. Adjust outer body panels
    a. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. HP-I
    b. Inspect, remove, replace, and align hood, hood hinges, and hood latch. HP-I
    c. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. HP-I
    d. Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. HP-I
    e. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. HP-I
    f. Inspect, remove, replace and align front fenders, headers, and other panels. HP-I
    g. Diagnose and repair water leaks, dust leaks, and wind noise. HP-G
7. Remove mechanical and electrical components
    a. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. HP-I
    b. Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. HP-G
    c. Inspect, repair or replace, and adjust removable, manually or power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. HP-G
    d. Inspect, remove, reinstall, and align convertible top and related mechanisms. HP-G
    e. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. HP-G
8. Install mechanical and electrical components
    a. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. HP-I
    b. Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. HP-G
    c. Inspect, repair or replace, and adjust removable, manually or power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. HP-G

d. Inspect, remove, reinstall, and align convertible top and related mechanisms. HP-G
e. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. HP-G

9. Demonstrate safety protocol appropriate for the auto repair setting
    a. Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. HP-I
    b. Identify safety and personal health hazards according to OSHA guidelines. HP-I
    c. Inspect spray environment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. HP-I
    d. Select and use the NIOSH approved personal sanding respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
    e. Select and use the NIOSH approved (Fresh Air Make-up System) personal painting/refinishing respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
    f. Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.). HP-I
10. Perform intermediate welding skills on non-structural damage repairs
    a. Identify weldable and non-weldable materials used in collision repair. HP-I
    b. Weld and cut high-strength steel and other steels. HP-I
    c. Weld and cut aluminum. HP-G
    d. Determine the correct GMAW (Mig) welder type, electrode, wire type, diameter, and gas to be used in a specific welding situation. HP-I
    e. Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the material being welded. HP-I
    f. Store, handle, and install high-pressure gas cylinders. HP-I
    g. Determine work clamp (ground) location and attach. HP-I
    h. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions. HP-I
    i. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. HP-I
    j. Protect computers and other electronic control modules during welding procedures. HP-I
    k. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld through primer if necessary, and clamp as required. HP-I
    l. Determine the joint type (butt weld with backing, lap, etc.) for weld being made. HPI
    m. Determine the type of weld (continuous, butt weld with backing, plug, etc.) for each specific welding operation. HP-I
    n. Perform the following welds: continuous, stitch, tack, plug, butt weld with and without backing, and fillet. HP-I
    o. Perform visual and destructive tests on each weld type. HP-I
    p. Identify the causes of various welding defects; make necessary adjustments. HP-I
    q. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. HP-I
    r. Identify cutting process for different materials and locations perform cutting operation. HP-I

s. Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.) HP-G

11. Perform plastic and adhesive repairs
    a. Identify the types of plastics; determine repairability. HP-I
    b. Identify the types of plastic repair procedures; clean and prepare the surface of plastic parts. HP-I
    c. Replace or repair rigid, semi-rigid, and flexible plastic panels. HP-G
    d. Remove or repair damaged areas from rigid exterior composite panels. HP-G
    e. Replace bonded rigid exterior composite body panels; straighten or align panel supports. HP-G

Course Content:

A. Trim and Hardware Removal
B. Trim and Hardware Installation
C. Movable Glass
D. Outer Body Panel Repair
E. Outer Body Panel Replacement
F. Outer Body Panel Adjustments
G. Mechanical and Electrical Components Removal
H. Mechanical and Electrical Components Installation
I. Safety Protocol
J. Intermediate Welding Skills
K. Plastic and Adhesive Repairs

Learning Assessments:

Assessments may include quizzes, tests, project work, demonstrated competence, instructor observation, weekly assignments and/or written papers.

Instructional Materials:

Textbook: Duffy, J.E. (2015). *Auto Body Repair Technology. (*6th ed.). Boston, MA: Cengage Learning. ISBN: 9781133702856.

Textbook: Duffy, J.E. *(2015). Tech Manuel for Duffy's Auto Body Repair Technology. (6*th ed.). Boston, MA: Cengage Learning. SBN: 9781133702863.

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.