

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Non-Structural Analysis and Damage Repair 4
COURSE NUMBER	ACRT 0222
DIVISION	Career and Technical Education
DEPARTMENT	ACRT
CIP CODE	47.0603
CREDIT HOURS	5
CONTACT HOURS/WEEK	Class: 2 Lab: 6 Clinical: X
PREREQUISITES	ACRT0100 Safety & Orientation ACRT0101 OSHA 10 ACRT0120 Non-Structural Analysis & Damage Repair 1 ACRT0220 Non-Structural Analysis & Damage Repair 2 ACRT0221 Non-Structural Analysis & Damage Repair 3
COREQUISITES	None
COURSE PLACEMENT	None

COURSE DESCRIPTION

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

PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

https://kansasregents.org/workforce_development/program-alignment

PROGRAM LEARNING OUTCOMES

1. Demonstrate adherence to safety and pollution prevention standards according to OSHA and EPA regulations.
2. Demonstrate the ability to communicate effectively in workplace scenarios with an appropriate level of preparedness for daily tasks and assignments.
3. Demonstrate the ability to diagnose and repair non-structural and structural damage according to Original Equipment Manufacturer (OEM) specifications and recommendations.

TEXTBOOKS

<http://kckccbookstore.com/>

METHOD OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

- I. 2.A Preparation
- II. 2.B Outer Body Panel Repairs, Replacements, and Adjustments
- III. 2.C Metal Finishing and Body Filling
- IV. 2.D Moveable Glass and Hardware
- V. 2.E Metal Welding and Cutting
- VI. 2.F Plastics and Adhesives
- VII. 4.A Safety Precautions

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

A. Remove trim and hardware

1. Inspect, remove, store, and replace exterior trim and moldings. (HP-I)(2.A.2)(DAM04 v.2.1 module 4 DAM04 v.2.2 module 3 TRM01 modules 3,6,7).
2. Inspect, remove, store, and replace interior trim and components. (HP-I)(2.A.3)(DAM04 v.2.1 module 1 DAM04 v.2.2 modules 1,2 TRM01 module 5).
3. Inspect, remove, store, replace non-structural body panels and components that may interfere with or be damaged during repair. (HP-I) (2.A.4)
4. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. (HP-G) (2.A.5).
5. Protect panels, glass and parts adjacent to the repair area. (HP-I) (2.A.6).
6. Inspect, remove, and replace repairable plastics and other components that are recommended for off-vehicle repair. (HP-I)(2.A.9)(DAM02 v.2.1 module 2 DAM02 v.2.2 module 1 EXT01 modules 1,2,3,4 Ext02 modules 1,2,3,4,5).
7. Damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. (HP-I) (2.A.1).

B. Install trim and hardware

8. Inspect, remove, store, and replace exterior trim and moldings. (HP-I)(2.A.2)(DAM04 v.2.1 module 4 DAM04 v.2.2 module 3 TRM01 modules 3,6,7).
9. Inspect, remove, store, and replace interior trim and components. (HP-I)(2.A.3)(DAM04 v.2.1 module 1 DAM04 v.2.2 modules 1,2 TRM01 module 5).
10. Inspect, remove, store, replace non-structural body panels and components that may interfere with or be damaged during repair. (HP-I) (2.A.4).

11. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. (HP-G) (2.A.5).
12. Protect panels, glass and parts adjacent to the repair area. (HP-I) (2.A.6).
13. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. (HP-I) (2.A.1).

C. Repair movable glass

14. Damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. (HP-I) (2.A.1)(DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,5 EXT01 module 1).
15. Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. (HP-I)(2.A.4)(DAM02 v.2.1 modules2,3 DAM02 v.2.2 module 2 DAM04 v.2.1 module 3 DAM04 v.2.2 modules 2,3 EXT01 modules 1,2,3,4,5).
16. Protect panels, glass, and parts adjacent to the repair area. (HP-I)(2.A.6)(EXT01 module 1 EXT02 modules 1,2,3,4,5).
17. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. (HP-I) (2.E.9)EXT02 modules 1,2,3,4,5 WCS01 module 1).
18. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. (HP-I)(2.D.1)(DAM04 module 2 GLA 01 module 2 PWR01 module 5).
19. Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. (HP-G)(2.D.2)(WNW01 modules 1,2,3).
20. 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)(2.D.3)(DAM04 module 2 GLA01 module 3 PWR01 module5).
21. Inspect, remove, reinstall, and align convertible top and related mechanisms. (HP-G) (2.D.4)(DAM04 module 2).

D. Protect adjacent body panels

22. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. (HP-I)(2.A.1)(DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,5 EXT01 module 1).
23. Inspect, remove, store, and replace exterior trim and moldings. (HP-I) (2.A.2)(DAM04 v.2.1 module 4 DAM04 v.2.2 module 3 TRM01 modules 3,6,7).
24. Inspect, remove, store, and replace interior trim and components. (HP-I) (2.A.3)(DAM04 v.2.1 module 1 DAM04 v.2.2 modules 1,2 TRM01 module 5).
25. Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. (HP-I) (2.A.4)(DAM02 v.2.1 modules2,3 DAM02 v.2.2 module 2 DAM04 v.2.1 module 3 DAM04 v.2.2 modules 2,3 EXT01 modules 1,2,3,4,5).
26. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. (HP-I)(2.B.1) (DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules1,2,3,4,EXT01 module01).
27. 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)(2.B.9)(EDS01 modules 2,3 STS01 module 2).

28. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. (HP-I)(2.E.9).

E. Repair outer body panel

29. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. (HP-I)(2.B.1) (DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,EXT01 module 01).
30. Determine the extent of damage to aluminum body panels; repair or replace. (HP-G)(2.B.3) (DAM05 module 2 PRA 01 modules 1,2,3,4,5 STA01 modules 2,3).
31. 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)(2.B.9)(EDS01 modules 2,3 STS01 module 2).
32. Weld damaged or torn steel body panels; repair broken welds. (HP-I)(2.B.10)(EDS01 module 3).
33. Restore corrosion protection. (HP-I)(2.B.11)(CPS01 modules 3,4).
34. Replace door skins. (HP-G)(2.B.12)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3 EXT02 module 2).
35. Restore sound deadeners and foam materials. (HP-I)(2.B.13)(FOM01 modules 1,2,3,4).
36. Perform panel bonding. (HP-G)(2.B.14)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3).
37. Diagnose and repair water leaks, dust leaks, and wind noise. (HP-G) (2.B.15)(WNW01 modules 1,2,3).
38. Remove paint from the damaged area of a body panel. (HP-I)(2.C.1)(EDS01 module 3 STS01 module 2).
39. Locate and reduce surface irregularities on a damaged body panel. (HP-I)(2.C.2)(DAM02 v.2.1 module 3 DAM02 v.2.2 module 2 EDS01 module 2,3,4 FCR01 v.2.1 module 2 FCR01 v.2.2 module 3 STS01 module 1,2).
40. Demonstrate hammer and dolly techniques. (HP-I)(2.C.3)(EDS01 module 2 STS01 module 2).
41. Heat shrink stretched panel areas to proper contour. (HP-I)(2.C.4)(EDS01 module 2 STS01 module 2).
42. Cold shrink stretched panel areas to proper contour. (HP-I)(2.C.5)(EDS01 module 2 STS01 module 2).
43. Mix body filler. (HP-I)(2.C.6)(EDS01 module 3 STS01 module 2).
44. Apply body filler; shape during curing. (HP-I)(2.C.7)(EDS01 module 3 STS01 module 2).
45. Rough sand cured body filler to contour; finish sand. (HP-I)(2.C.8)(EDS01 module 3 STS01 module 2).
46. Determine the proper metal finishing techniques for aluminum. (HP-G) (2.C.9)(DAM 05 module 2 STA01 modules 2,3).
47. Determine proper application of body filler to aluminum. (HP-G) (2.C.10)(PRA01 modules 3,5 STA01 module 2).

F. Replace outer body panels

48. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. (HP-I)(2.B.1) (DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,EXT01 module 01).

49. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. (HP-I)(2.B.2)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3 DAM02 v.2.1 modules 1,2,3 DAM02 v.2.2 module 2 EXT01 modules 1,2,3,4 EXT02 modules 1,2,3,4,5).
50. Inspect, remove, replace, and align hood, hood hinges, and hood latch. (HP-I)(2.B.4)(DAM05 module 2 PRA 01 modules 1,2,3,4,5 STA01 modules 2,3).
51. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. (HP-I)(2.B.5) (DAM04 module 3 EXT01 module 4).
52. Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. (HP-I)(2.B.6)(DAM04 modules 2,3 EXT01 modules 3,4 EXT02 module 2).
53. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. (HP-I)(2.B.7)(DAM02 module 2 EXT01 module 2 EXT02 module 5).
54. Inspect, remove, replace and align front fenders, headers, and other panels. (HP-I)(2.B.8) (DAM02 v.2.1 module 3 DAM02 v.2.2 module 2 EXT01 module 2 EXT02 module 5).
55. Restore corrosion protection. (HP-I)(2.B.11)(CPS01 modules 3,4).
56. Replace door skins. (HP-G)(2.B.12)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3 EXT02 module 2).
57. Restore sound deadeners and foam materials. (HP-I)(2.B.13)(FOM01 modules 1,2,3,4).
58. Perform panel bonding. (HP-G)(2.B.14)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3).
59. Diagnose and repair water leaks, dust leaks, and wind noise. (HP-G)(2.B.15)(WNW01 modules 1,2,3).

G. Adjust outer body panels

60. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. (HP-I)(2.B.1) (DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,EXT01 module 01).
61. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. (HP-I)(2.B.2)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3 DAM02 v.2.1 modules 1,2,3 DAM02 v.2.2 module 2 EXT01 modules 1,2,3,4 EXT02 modules 1,2,3,4,5).
62. Inspect, remove, replace, and align hood, hood hinges, and hood latch. (HP-I)(2.B.4)(DAM05 module 2 PRA 01 modules 1,2,3,4,5 STA01 modules 2,3).
63. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. (HP-I)(2.B.5) (DAM04 module 3 EXT01 module 4).
64. Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. (HP-I)(2.B.6)(DAM04 modules 2,3 EXT01 modules 3,4 EXT02 module 2).
65. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. (HP-I)(2.B.7)(DAM02 module 2 EXT01 module 2 EXT02 module 5).
66. Inspect, remove, replace and align front fenders, headers, and other panels. (HP-I)(2.B.8) (DAM02 v.2.1 module 3 DAM02 v.2.2 module 2 EXT01 module 2 EXT02 module 5).
67. Restore corrosion protection. (HP-I)(2.B.11)(CPS01 modules 3,4).
68. Replace door skins. (HP-G)(2.B.12)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3 EXT02 module 2).
69. Restore sound deadeners and foam materials. (HP-I)(2.B.13)(FOM01 modules 1,2,3,4).
70. Perform panel bonding. (HP-G)(2.B.14)(ADH01 v.1.2 module 1 ADH01 v.1.3 modules 1,2,3).
71. Diagnose and repair water leaks, dust leaks, and wind noise. (HP-G)(2.B.15)(WNW01 modules 1,2,3).

H. Replace mechanical and electrical components

72. Damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. (HP-I)(2.A.1)(DAM01 v.2.4 modules 1,2 DAM01 v.2.5 modules 1,2,3,4,5 EXT01 module 1).
73. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. (HP-G) (2.A.5)(DAM03 v.2.2 modules 1,2,3,4,5,6 DAM03 v.2.4 modules 1,7 DAM04 modules 1,2,3 Dam06 module 2 Ext01 module 3).
74. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. (HP-I)(2.A.5).
75. Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. (HP-G)(2.D.2)(WNW01 modules 1,2,3).
76. 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)(2.D.3)(DAM04 module 2 GLA01 module 3 PWR01 module 5).
77. Inspect, remove, reinstall, and align convertible top and related mechanisms. (HP-G) (2.D.4)(DAM04 module 2).
78. Protect computers and other electronic control modules during welding procedures. (HP-I) (2.E.10).

I. Demonstrate safety protocol appropriate for the auto repair setting

79. Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. (HP-I)(4.A.1)(EDS02 module 1 REF01 module 4 REF03 modules 2,4 WKR01 module 3).
80. Identify safety and personal health hazards according to OSHA guidelines. (HP-I) (4.A.2)(WKR01 module 1).
81. Inspect spray environment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. (HP-I)(4.A.3)(EDS02 module 1 REF01 module 3 WKR01 module 2).
82. Select and use the NIOSH approved personal sanding respirator. The student will be able to inspect condition and ensure fit and operation. The student will be able to perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. (HP-I)(4.A.4)(WKR01 module 4).
83. Select and use the NIOSH approved (Fresh Air Make-up System) personal painting/refinishing respirator system. The student will be able to perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. (HP-I)(4.A.5)(EDS02 module 1 REF01 module 2 WKR01 module 4).
84. 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)(4.A.6)(EDS02 modules 1,2,3,4,5,6,7 REF02 module 2 REF03 modules 2,4 WKR01 module 4).

J. Perform welding skills on non-structural damage repairs

85. Identify weldable and non-weldable materials used in collision repair. (HP-I)(2.E.1).

86. Weld and cut high-strength steel and other steels. (HP-I)(2.E.2)(EXT02 module 1 WCS01 v.1.2 modules 1,2,3,4 WCS01v.1.3 modules 1,2,3,4,5).
87. Weld and cut aluminum. (HP-G)(2.E.3)(WCS01 modules 1,2).
88. Determine the correct GMAW (MIG) welder type, electrode, wire type, diameter, and gas to be used in a specific welding situation. (HP-I)(2.E.4)(EXT02 module 1 WCS01 module 1).
89. 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)(2.E.5)(WCS01 module 1).
90. Store, handle, and install high-pressure gas cylinders. (HP-I)(2.E.6)(WCS01 module 1).
91. Determine work clamp (ground) location and attach. (HP-I)(2.E.7)(WCS01 v.1.2 module 1).
92. 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)(2.E.8) (WCS01 v.1.2 module 1 WCS01 v.1.3 modules 1,2,3,4,5).
93. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. (HP-I)(2.E.9)EXT02 modules 1,2,3,4,5 WCS01 module 1).
94. Protect computers and other electronic control modules during welding procedures. (HP-I)(2.E.10)(WCS01 module 1).
95. 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)(2.E.11)(WCS01 v.1.2 module 1).
96. Determine the joint type (butt weld with backing, lap, etc.) for weld being made. (HP-I)(2.E.12)(WCS02 modules 1,2,3,4,5).
97. Determine the type of weld (continuous, butt weld with backing, plug, etc.) for each specific welding operation. (HP-I)(2.E.13)(WCS02 modules 1,2,3,4,5).
98. Perform the following welds: continuous, stitch, tack, plug, butt weld with and without backing, and fillet. (HP-I)(2.E.14)(WCS01 v.1.2 modules 2,3,4).
99. Perform visual and destructive tests on each weld type. (HP-I)(2.E.15)(WCS01 v.1.2 modules 2,3,4).
100. Identify the causes of various welding defects; make necessary adjustments. (HP-I)(2.E.16) (WCS01 v.1.2 module 1).
101. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. (HP-I)(2.E.17)(WCS01 module 1).
102. Identify cutting process for different materials and locations perform cutting operation. (HP-I) (2.E.18)(WCS05 module 4).
103. Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.) (HP-G)(2.E.19)(ADH01 v.1.2 module 1 ADH01 V.1.3 modules 1,2,4 EXT02 modules 1,2,3,4,5 WCS04 v.2.1 modules 1,2,3 WCS04 v.2.2 modules 1,2,3,4).

K. Perform plastic and adhesive repairs

104. Identify the types of plastics; determine repair ability. (HP-I)(2.F.1)(DAM02 module 2 PLA01 modules 1,3 PLA02 modules 1,4).
105. Identify the types of plastic repair procedures; clean and prepare the surface of plastic parts. (HP-I)(2.F.2)(PLA01 modules 1,2 PLA 02 modules 1,2).
106. Replace or repair rigid, semi-rigid, and flexible plastic panels. (HP-G)(2.F.3)(EXT01 module 1,2,3,4,5,6 EXT02 modules 2,3,4 PLA01 module 2 PLA02 modules 2,3).

107.Remove or repair damaged areas from rigid exterior composite panels. (HP-G)(2.F.4)(EXT02 module 2 PLA02 module 3).

108.Replace bonded rigid exterior composite body panels; straighten or align panel supports. (HP-G)(2.F.5)(EXT02 module 2).

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.