Course Number: Instructor: Jeff Owen
OCAS Code: Phone Number: 580.327.0344
Course Length: 30 hours Email: jowen@nwtech.edu
Career Cluster: Transportation, Distribution, & Logistics
Career Pathway: Automotive Collision Repair
Career Major: Combination Collision Repair Technician, Non-Structural Repair Technician, Refinishing Technician
Pre-requisite: None
Course Description: Within this course the student will learn about the different fasteners used in vehicle construction. Students will cover removing and installing trim, locks and trim panels while experiencing different types of hardware or attachment methods.
Instructional Philosophy: The instructor will provide not only technical training in the Auto Collision Technology area but also soft-skills training in an effort to provide training and services needed for students to succeed in the workplace.
Course Goals: Upon successful completion of this course, the student will be able to:

- Review damage report and analyze damage to determine appropriate methods for overall repair; develop repair plan.
- Inspect, remove, store, and replace exterior trim and moldings.
- Inspect, remove, store, and replace interior trim and components.
- Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair.
- Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair.
- Protect panels, glass, and parts adjacent to repair area.
- Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants from those areas to be repaired.
- Remove corrosion protection, undercoatings, sealers, and other protective coatings necessary to perform repairs.
- Inspect, remove, and replace repairable plastics and other components that are recommended for off-vehicle repair.
- Apply safety procedures associated with vehicle components and systems such as ABS, air bags, refrigerants, batteries, tires, oil, anti-freeze, engine coolants, etc.
- Apply environmental practices associated with vehicle components and systems such as substrates, fluids, refrigerants, batteries, etc.
- Identify suspension system fasteners that should not be reused.
- Inspect and replace rack and pinion steering gear, tie rod ends, and bellows boots.
- Inspect alignment, adjust tension, and replace power steering pump belts.
- Remove and replace power steering pump, pulleys; inspect pump mounts.
- Inspect and replace power steering hoses and fittings.
- Remove and replace power steering gear (non-rack and pinion type).
- Remove and replace power rack and pinion steering gear; inspect and replace mounting bushings and brackets; ensure proper mounting location.
- Inspect and adjust (where applicable) steering linkage geometry (attitude/parallelism).
- Inspect and replace pitman arm.
- Inspect and replace relay (center link/intermediate) rod.
- Inspect, remove and replace idler arm and mountings.
- Inspect, remove and replace tie rod sleeves, clamps, and tie rod ends.
- Inspect, remove and replace steering linkage damper.
- Inspect, remove and replace upper and lower control arms.
- Inspect, remove and replace upper and lower control arm bushings, shafts and rebound bumpers.
- Inspect, remove and replace upper and lower ball joints.
- Inspect, remove and replace steering knuckle/spindle/hub assemblies (including bearings, races, seals, etc.).
- Inspect, remove and replace front suspension system coil springs and spring insulators (silencers).
- Inspect, remove, replace, and adjust suspension system torsion bars, and inspect mounts.
- Inspect, remove and replace stabilizer bar bushings, brackets, and links.
- Inspect, remove and replace MacPherson strut cartridge or assembly, upper bearing, and mount.
- Inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts.
- Inspect, remove, and replace suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
- Inspect axle assembly for damage and misalignment.
- Inspect, remove and replace shock absorbers.
- Inspect, remove 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.
- Measure vehicle ride height; determine needed repairs.
- Inspect, remove, replace, and align front and rear frame (cradles/stub).
- Diagnose steering column damage, looseness, and binding problems (including tilt mechanisms); determine needed repairs.
- Inspect, remove and replace steering shaft U-joint(s), flexible coupling(s), collapsible columns, and steering wheels.
- Diagnose manual and power steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine needed repairs.
- Diagnose power rack and pinion steering gear noises, vibration, looseness, hard steering, and fluid leakage problems, ensure proper mounting location; determine needed repairs.
- Diagnose non-MacPherson front and rear suspension system noises and body sway problems; determine needed repairs.
- Diagnose MacPherson strut suspension system noises and body sway problems;
determine needed repairs.

- Diagnose vehicle wandering, pulling, hard steering, bump steer, memory steering, torque steering, and steering return problems; determine needed repairs.
- Adjust front and rear wheel camber on suspension systems with camber adjustments.
- Check front and rear wheel camber on adjustable and non-adjustable suspension systems; determine needed repairs.
- Adjust caster on suspension systems with caster adjustments.
- Check caster on adjustable and non-adjustable suspension systems; determine needed repairs.
- Check and adjust wheel toe; determine needed adjustment or repair.
- Center steering wheel.
- Identify toe-out-on-turns (turning radius) related problems; determine needed repairs.
- Identify SAI (steering axis inclination)/KPI (king pin inclination) related problems; determine needed repairs.
- Identify thrust angle related problems; determine needed repairs.
- Check for front wheel setback; determine needed repairs.
- Diagnose tire wear patterns; determine needed repairs.
- Inspect tires, identify direction of rotation, and location; check and adjust air pressure.
- Diagnose wheel/tire vibration, shimmy, and tramp (wheel hop) problems; determine needed repairs.
- Measure wheel, tire, axle, and hub runout; determine needed repairs.
- Diagnose tire pull (lead) problems; determine corrective actions.
- Reinstall wheels and torque lug nuts according to manufacturer's specifications.

**Major Course Projects:**
Students are allowed to work on their own projects as well as live-work projects as approved by instructor.

Students will compile a portfolio which includes classroom theory and activities as well as a summary of hands-on work in the shop. Students will include photographs of projects and live work projects with descriptions for each photo.

**Project Outline:**
Students may begin working on projects as their skill level allows. All projects must be completed by the first of May. These projects will reinforce classroom theory instruction and will require the student to consult industry service information during the course of task performance.

**Instructional Delivery Plan:**
The instruction for this course will utilize various methods in an effort to promote and accommodate different learning styles including classroom lecture, classroom demonstrations, shop demonstrations, hands-on learning activities, classroom discussion, interactive media, textbook, computer based learning activities, research projects, guest speakers, and student presentations. Students will be required to work independently as well as in teams. Assignments will require students to use academic skills in math, science, and language arts.

**Assessment Plan:**
Pass Safety Test with 100% accuracy.

Assessment Plan:
50% Performance of technical skills
45% Tests and written assignments
5% Academic Career Center (ACC)

Grading Scale:
A  90-100  Exceeds expectations
B  80-89  Meets industry standards and expectations
C  70-79  Passing grade, but does not meet some standards
D 60-69  Passing, but only meets the minimum standards  
F  Below 60  Failing, does not meet minimum standards

Alliance Credit Offered: OSU-IT

Industry Alignments: ICAR

End of Instruction Industry Assessment: Students will have to pass Safety Test at 100% accuracy and demonstrate safety practices.

Auto Body: Non-Structural Analysis & Damage Repair Technician - CTTC  
http://www.okcareertech.org/testing/PDF_Docs/FY08pdf/32002_NonStructAnalysisRepairTech.pdf

ASE: Collision Repair and Refinish Series – Non-Structural Analysis and Damage Repair  
http://www.okcareertech.org/testing/Skills_Standards/TransportationCareer_Cluster.htm

NOCTI: Collision Repair Technology -  
http://www.nocti.org/PDFs/JobReady/3006_Collision_Repair.pdf

NOCTI: Collision Repair and Refinishing Technology -  

Resources:  
I-CAR Worker Protection Curriculum  
SP/2 – http://www.sp2.org

Transportation, Distribution, & Logistics Career Cluster Resources -  

Attachments:  
Student curriculum is available at www.nwtech.edu/owen/