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PROGRAM CONCENTRATION: Architecture, Construction,
Communications & Transportation
CAREER PATHWAY: Collision Repair
COURSE TITLE: Non Structural Analysis and Damage Repair I
PREREQUISITE: Introduction to Collision Repair

Course Description: Non Structural Analysis and Damage Repair I is the first course in the non structural strand of the collision repair career pathway that will teach the student skills and knowledge that will help them obtain a career in the automotive body repair industry. The student will learn theory as well as hands on application in a project based setting. This training will give successful completers basic skills and knowledge to obtain an entry level job in the field of non structural damage repair.

ACCT- NSI-1. Preparation --- Students will be able to generate an overall repair plan for any repair(s) needed. Students will be able to inspect remove and store any parts that need to be replaced.

- a. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan.
- b. Inspect, remove, store, and replace exterior trim and moldings.
- c. Inspect, remove, store, and replace interior trim and components.
- d. Inspect, remove, store, and replace non structural body panels and components that may interfere with or be damaged during repair.
- e. Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair.
- f. Protect panels, glass, and parts adjacent to the repair area.
- g. Soap and water wash the entire vehicle; use appropriate cleaner to remove contaminates from those areas to be repaired.
- h. Remove corrosion protection, under coatings, sealers, and other protective coatings necessary to perform repairs.
- i. Inspect, remove, and replace repairable plastics and other components that are recommended for off- vehicle repair.

Academic Standard(s)

SCSH2- Students will use standard safety practices for all classroom, laboratory and field investigations.

- c. Follow correct protocol for identifying and reporting safety problems and violations.

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- SCSH3- Students will identify and investigate problems scientifically.
- Suggest reasonable hypotheses for identified problems.
 - Develop procedures for solving scientific problems.
 - Collect organize and record appropriate data.
 - Develop reasonable conclusions based on data collected.
 - Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.
- SPS8- Students will determine relationships among force, mass, and motion.
- Calculate amounts of work and mechanical advantage using simple machines.
- MM3P1- Students will solve problems (using appropriate technology)
- Build new mathematical knowledge through problem solving.
 - Solve problems that arise in mathematics and in other contexts.
 - Apply and adapt a variety of appropriate strategies to solve problems.
- MM3P3- Students will communicate mathematically.
- Organize and consolidate their mathematical thinking through communication.
 - Communicate their mathematical thinking coherently and clearly to peers, teachers and others.
- MM3P4- Students will make connections among mathematical ideas and to other Disciplines.
- Recognize and apply mathematics in contexts outside of mathematics.

National Academic Standards (NATEF)

- SC041- Applies and uses laboratory safety techniques.
SC042- Applies and uses tables and graphs.
SC044- Applies and uses scientific method.
SC492- Measures force.
SC499- Uses computers for information gathering and estimating.
SC513- Describes and explains torque.

ACCT-NSI-2. Outer Body Panel Repairs, Replacements and Adjustments --- Students will be able to replace, align, straighten or service any exterior panel on a vehicle.

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- a. Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan.
- b. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies.
- c. Determine the extent of damage to aluminum body panels repair and replace.
- d. Inspect, remove, replace, and align hood, hood hinges, and hood latch.
- e. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch.
- f. Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware.
- g. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware.
- h. Inspect, remove, replace, and align front fenders, headers and other panels.
- i. 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.
- j. Weld damaged or torn steel body panels; repair broken welds
- k. Restore corrosion protection.
- l. Replace door skins.
- m. Restore sound deadeners and foam materials.
- n. Perform panel bonding.
- o. Diagnose and repair water leaks, dust leaks, and wind noise.

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SPS8- Students will determine relationships among force, mass, and motion.

- e. Calculate amounts of work and mechanical advantage using simple machines.

SPS5- Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.

- a. Compare and contrast the atomic/molecular motion of

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solids, liquids, gasses and plasmas.

- b. Relate temperature, pressure, and volume of gasses to the behavior of gasses.

MM3P1- Students will solve problems (using appropriate technology)

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SC492- Measures force.

SC499- Uses computers for information gathering and estimating.

SC513- Describes and explains torque.

MA229- Solves problems. Generates conclusions. Demonstrates Deductive reasoning.

MA271- Determines proper operation.

MA273- Computes tolerances/ranges mentally.

MA274- Computes proper operations mentally.

ACCT-NSI-3. Metal Finishing and Body Filling --- Students will be able to straighten steel body panels by using appropriate tools. The student will be able to shrink metal, mix and apply body filler, and block sand filler to level.

- a. Remove paint from the damaged area of a body panel.
- b. Locate and reduce surface irregularities on a damaged body panel.
- c. Demonstrate hammer and dolly techniques.
- d. Heat shrink stretched panel areas to proper contour.
- e. Cold shrink stretched panel areas to proper contour.
- f. Mix and apply body filler.

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- g. Shape body filler during curing.
- h. Rough sand cured body filler to contour; finish sand.
- i. Determine the proper metal finishing techniques for aluminum.
- j. Determine the proper application of body filler to aluminum.

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SC5- Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.

- g. demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.
- h. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.

SPS8- Students will determine relationships among force, mass, and motion.

- e. Calculate amounts of work and mechanical advantage using simple machines.

SPS5- Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.

- a. Compare and contrast the atomic/molecular motion of solids, liquids, gasses and plasmas.
- b. Relate temperature, pressure, and volume of gasses to the behavior of gasses.

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MM3P4- Students will make connections among mathematical ideas and to other disciplines.

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National Academic Standards (NATEF)

SC041- Applies and uses laboratory safety techniques.

SC042- Applies and uses tables and graphs.

SC044- Applies and uses scientific method.

SC116- Describes chemical reactions with a catalyst.

SC121- Describes chemical reactions with an inhibitor.

SC213- Describes electro chemical reactions such as Oxidation/reduction.

SC395- Describes and explains solution and solvents.

SC443- Explain relative humidity.

SC492- Measures force.

SC499- Uses computers for information gathering and estimating.

SC513- Describes and explains torque.

MA229- Solves problems. Generates conclusions. Demonstrates deductive reasoning.

MA271- Determines proper operation.

MA273- Computes tolerances/ranges mentally.

MA274- Computes proper operations mentally.

Reading Across the Curriculum

Reading Standard Comment

After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

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Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

Students will enhance reading in all curriculum areas by:

- a. Reading in all curriculum areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
 - Read both informational and fictional texts in a variety of genres and modes of discourse.
 - Read technical texts related to various subject areas.
- b. Discussing books
 - Discuss messages and themes from books in all subject areas.
 - Respond to a variety of texts in multiple modes of discourse.
 - Relate messages and themes from one subject area to messages and themes in another area.
 - Evaluate the merit of texts in every subject discipline.
 - Examine author's purpose in writing.
 - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
 - Demonstrate an understanding of contextual vocabulary in various subjects.
 - Use content vocabulary in writing and speaking.
 - Explore understanding of new words found in subject area texts.
- d. Establishing context
 - Explore life experiences related to subject area content.
 - Discuss in both writing and speaking how certain words are subject area related.
 - Determine strategies for finding content and contextual meaning for unknown words.

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CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

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CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.