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PROGRAM CONCENTRATION: Architecture, Construction,
Communications & Transportation

CAREER PATHWAY: Collision Repair

COURSE TITLE: Introduction to Collision Repair

Course Description:

Introduction to collision repair is the prerequisite to all other courses in the collision repair pathway. Employment opportunities in the collision repair field will be explored. In this course the student will be exposed to all areas of collision repair and automotive refinish such as safety, refinishing, metal repair, plastic repair, automotive construction, and estimate reading and writing. Basic skills in all of the above mentioned areas will be taught.

ACCT-ICR-1. Safety---Students will comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power tools; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and environmental regulations. For every task in painting and refinishing these safety requirements must be strictly enforced.

- a. Identify and take necessary precautions with hazardous operations and materials according to federal state and local regulations.
- b. Identify safety and personal health hazards according to OSHA guidelines and the "Right to know Law".
- c. Inspect spray environments to ensure compliance with federal, state, and local regulations, and for safety and cleanliness hazards.
- d. Select and use the NIOSH approved cartridge respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA regulations.
- e. Select and use the NIOSH approved (fresh air make- up system). Perform proper maintenance in accordance to OSHA regulations.
- 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.).

Academic Standard(s):

SEV4- Students will understand and describe availability, allocation and conservation of energy and other resources.

c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.

e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and

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some alter technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.

SEV5- Students will recognize that humans are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

c. Explain how human activity affect global and local sustainability.

e. Describe the effects and potential implications of pollution and resource depletion on the environment at the global levels(e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).

f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.

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.

National Academic Standards (NATEF)

SC007- Analyzes and evaluates environmental issues

SC012- Analyzes / evaluates environmental issues such as waste management.

SC041- Applies and uses laboratory safety techniques.

ACCT-ICR-2 Collision Repair Careers--- Students will explore the different areas of the collision repair industry. The students will learn what skills and knowledge are needed to be successful in each area of collision repair.

a. Compare each career pathway in the collision repair field.

b. Research and report on one area of the collision repair field.

Academic Standard(s):

SCSH3- Students will Identify and investigate problems scientifically.

d. Graphically compare and analyze data points and or summary statistics.

e. Develop reasonable conclusions based on Data collected.

MM3D3- Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.

National Academic Standards (NATEF)

MA229- Solves problems generates conclusions.

SC041- Applies and uses laboratory safety techniques.

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SC044- Applies and uses scientific method.

ACCT-ICR-3 Tools and Equipment--- Students will identify and correctly use power tools and hand tools used in collision repair.

a. Identify, use, and maintain common hand tools in the collision repair shop.

b. Identify, use, and maintain common power tools in the collision repair shop.

Academic Standard(s):

MA171- Identifies metric measurements Length/ Volume/Weight.

SC-492- Measures force.

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

e. Calculate amounts of work and mechanical advantages of using simple machines.

National Academic Standards (NATEF)

SC248- Describes and explains force.

SC041- Applies and uses laboratory safety techniques.

SC044- Applies and uses scientific method.

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

MA271- Determines proper operation.

MA273- Computes tolerances/ranges mentally.

ACCT-ICR-4 Basic Metal Repair--- Students will learn basic metal repair techniques. They will also be able to distinguish between steel and aluminum.

a. Distinguish between steel and aluminum.

b. Demonstrate the ability to rough out a dent in a steel panel with a hammer and dolly.

c. Demonstrate the ability to metal finish a dent in a steel panel with a hammer and dolly.

d. Demonstrate the ability to remove a dent from a steel panel with a weld on dent puller.

e. Demonstrate the ability to mix, apply, and block sand body filler to level.

f. Demonstrate the ability to mix, apply and block sand primer surfacer.

g. Demonstrate safe work habits at all times and follow all class room safety rules.

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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.

SCSH3- Students will identify and investigate problems scientifically.

a. Suggest reasonable hypotheses for identified problems.

b. Develop procedures for solving scientific problems.

c. Collect organize and record appropriate data.

e. Develop reasonable conclusions based on data collected.

f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

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.

MM3P1- Students will solve problems (using appropriate technology)

a. Build new mathematical knowledge through problem solving.

b. Solve problems that arise in mathematics and in other contexts.

c. Apply and adapt a variety of appropriate strategies to solve problems.

MM3P3- Students will communicate mathematically.

a. Organize and consolidate their mathematical thinking through communication.

b. Communicate their mathematical thinking coherently and clearly to peers, teachers and others.

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

d. Recognize and apply mathematics in contexts outside of mathematics.

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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.

ACCT-ICR-5 Basic Plastic Repair--- Students will be able to identify the most common types of plastic used in automotive construction and be able to perform simple repairs on them.

- a. Distinguish between the common types of plastic.
- b. Properly repair dents gouges and cuts in plastic panels using various methods.
- c. Demonstrate safe work habits at all times and follow all class room safety rules.

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.

SCSH3- Students will identify and investigate problems scientifically.
a. Suggest reasonable hypotheses for identified problems.
b. Develop procedures for solving scientific problems.
c. Collect organize and record appropriate data.
e. Develop reasonable conclusions based on data collected.
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

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MM3P1- Students will solve problems (using appropriate technology)

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts
- c. Apply and adapt a variety of appropriate strategies to solve problems.

MM3P3- Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- c. Communicate their mathematical thinking coherently and clearly to peers, teachers and others.

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

- e. 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.

SC114- Describes/Explains chemical reactions.

SC116- Describes/Explains chemical reactions catalyst.

ACCT-ICR-6 Automotive Construction--- Students will identify the types of vehicle construction and know the advantages and disadvantages of each.

- a. Students will distinguish between body over frame construction and uni-body Construction.
- b. Students will discuss the advantages and disadvantages of body over fame and uni-body construction.
- c. Students will identify the parts of each type of vehicle construction.
- d. Students will discuss how each type of vehicle construction reacts in a collision and differences in repair techniques due to type of construction.

Academic Standard(s)

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

- b. Apply Newton's three laws to everyday situations by explaining the following:
 - inertia
 - Relationship between force, mass and acceleration
 - Equal and opposite forces

MM4P1- Students will solve problems (using appropriate technology).

- b. Solve problems that arise in mathematics and in other contexts.

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- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect the process of mathematical problem solving.

MM4P4- Students will make connections among mathematical ideas and to other disciplines.

- c. Recognize and apply mathematics in contexts outside of mathematics.

National Academic Standards (NATEF)

MA229- Solves problems, generates conclusions, deductive reasoning.

SC044- Applies uses scientific method

ACCT-ICR-7 Automotive Refinish--- Students will Identify and explain the differences in the different type of refinish material used in the automotive refinish industry as well as demonstrating basic spray techniques.

- a. Distinguish the difference in single stage and basecoat clear coat paint systems.
- b. Demonstrate the ability to mix and spray both single stage and basecoat clear coat paint systems.

Academic Standard(s):

SEV4- Students will understand and describe availability, allocation and conservation of energy and other resources.

- c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities. (businesses, governments, etc. have impact on energy efficiency.
- e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems, and implementation. problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.

SEV5- Students will recognize that humans are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

- c. Explain how human activity effect global and local sustainability.
- e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the Stratospheric ozone, global warming, and land uses).

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f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.

SCSH4- Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

- a. Develop and use systematic procedures for recording and organizing information.
- b. Use technology to produce tables and graphs.
- c. Use technology to develop, test, and revise experimental or mathematical models.

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.

SCSH3- Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect organize and record appropriate data.
- e. Develop reasonable conclusions based on data collected.
- f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

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.

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

SPS9- Students will investigate the properties of waves.

- a. Recognize that all waves transfer energy.
- d. Investigate the phenomena of reflection, refraction, interference, and diffraction.

MM3P1- Students will solve problems (using appropriate technology)

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.

MM3P3- Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers and others.

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

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disciplines.

b. Recognize and apply mathematics in contexts outside of mathematics.

c.

National Academic Standards (NATEF)

SC012- Analyzes / evaluates environmental issues such as waste management.

SC042- Applies and uses maps, charts, tables, and graphs.

SC044- Applies and uses the scientific method.

SC114- Describes and explains chemical reactions.

SC116- Describes chemical reactions with a catalyst.

SC121- Describes chemical reactions with an inhibitor.

SC321- Describes and explains light angle of incidence and reflection.

SC329- Describes and explains light (opaque).

SC335- Describes and explains light (translucent & transparent).

SC443- Explain relative humidity.

SC497- Measures volume of liquids and solids.

SC499- Uses computers for processing and estimating information.

SC512- Describes and explains how contamination effects chemical reactions.

SC522- Applies and uses ratio and proportion mixtures.

SC531- Describes and explains viscosity.

SC532- Describe and explain light sources.

MA028- Computes addition mentally.

MA126- Converts units from English to metric and metric to English.

MA161- Identifies English measurement: length / volume / weight.

MA171- Identifies Metric measurement: length / volume / weight.

MA182- Measures direct temperature.

MA184- Measures direct volume.

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

ACCT-ICR-8 Estimate reading and writing--- Students will be able to read and write both simple hand written and computer generated estimates.

a. Demonstrate the process of information gathering.

b. Demonstrate the process of Inspection.

c. Process the inspection results with known information and formulate a repair estimate.

Academic Standard(s):

SCSH3- Students will identify and investigate problems scientifically.

a. Suggest reasonable hypotheses for identified problems.

b. Develop procedures for solving scientific problems.

c. Collect organize and record appropriate data.

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- e. Develop reasonable conclusions based on data collected.
- f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

SCSH5- Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.

- c. Recognize the relationship between accuracy and precision.

MM4P1- Students will solve problems (using appropriate technology).

- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect the process of mathematical problem solving.

MM4P4- Students will make connections among mathematical ideas and to other disciplines.

- c. Recognize and apply mathematics in contexts outside of mathematics.

National Academic Standards (NATEF)

MA026- Computes addition decimals.

MA034- Computes addition whole numbers.

MA039- Computes division of decimals.

MA047- Computes division of whole numbers.

MA065- Computes multiplication of decimals.

MA073- Computes multiplication of whole numbers.

MA084- Computes subtraction of decimals.

MA092- Computes subtraction of whole numbers.

MA229- Solves problems, Generates conclusions.

SC012- Analyzes / evaluates environmental issues such as waste management.

SC042- Applies and uses maps, charts, tables, and graphs.

SC044- Applies and uses the scientific method.

SC499- Uses computers for information processing.

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

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in all subjects, they must learn the specific vocabulary of those subject areas in context.

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.

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- Determine strategies for finding content and contextual meaning for unknown words.

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.

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

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.