

July 2001
Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Commercial Sign Design and Fabrication
Program Type: Job Preparatory
Occupational Area: Industrial Education
Components: N/A

PSAV

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|------------------------|----------------|
| Program Numbers | I480202 |
| CIP Number | 0648.029900 |
| Grade Level | 30, 31 |
| Length | 1500 Hours |
| Certification | COMM ART @7G |
| Facility Code | 244 |
| CTSO | SkillsUSA-VICA |
| Coop Method | Yes |
| Apprenticeship | Yes |

Basic Skills

| | |
|----------|---|
| Math | 9 |
| Language | 9 |
| Reading | 9 |

I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in a variety of occupations in the commercial sign industry.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the commercial sign industry: planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of four occupational completion points as follows: (1) Sign Maker, Helper (Industry Title), Screen Printer, Helper (DOT 979.687-022); (2) Sign Maker (Industry Title), Screen Printer (DOT 979.684-034); (3) Sign Fabricator (Industry Title); (4) Sign Erector I (DOT 867.381-026. Sign Installer (Industry Title). When the recommended sequence is followed, the structure will allow students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training or become an occupational completer.

The content includes, but is not limited to, leadership, communication skills, human relations and employability skills, safe and efficient work practices, use of design, fabrication and installment techniques and processes to manufacture commercial signs, according to written specifications.

III. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the various processes and techniques of commercial sign manufacturing skills, including design; fabrication, including welding, sheet metal, electrical, woodworking, thermal forming; and installation and erection.

IV. **SPECIAL NOTE:** SkillsUSA-VICA, Inc. is the appropriate Career and Technical Student Organization (CTSO) for providing leadership training and for reinforcing specific career and technical skills. Career and Technical Student Organizations, when provided, shall be an integral part of the career and technical instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for adult vocational students to complete this program are: Mathematics 9.0, Language 9.0, Reading 9.0. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently through Vocational Preparatory Instruction (VPI). Please refer to the Rule for exemptions.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The standard length of this program is 1500 hours.

IV. **INTENDED OUTCOMES:** After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (300 Hours)
SCREEN PRINTER HELPER - DOT 979.687-022

- 01.0 Apply basic trade and safety skills.
- 02.0 Demonstrate basic lettering application.
- 03.0 Demonstrate basic sign making.
- 04.0 Apply basic design skills.
- 05.0 Demonstrate use of computer design software.
- 06.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (300 Hours)

SIGN MAKER - INDUSTRY TITLE

SCREEN PRINTER - DOT 979.684-034

- 07.0 Prepare layouts and illustrations.
- 08.0 Demonstrate basic silk-screening techniques.
- 09.0 Demonstrate applied math skills.
- 10.0 Demonstrate applied communication skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (600 Hours)

SIGN FABRICATOR - INDUSTRY TITLE

- 11.0 Apply basic shop and safety skills.
- 12.0 Demonstrate basic applied science skills.
- 13.0 Read and interpret shop drawings, diagrams, schematics and blueprints.
- 14.0 Apply basic engineering design principles.
- 15.0 Apply metal cutting and welding principles.
- 16.0 Fabricate specialty sheet metal.
- 17.0 Demonstrate the processes necessary to manufacture and finish plastic sign faces.
- 18.0 Demonstrate packing, crating and shipping techniques.
- 19.0 Demonstrate electrical wiring skills and techniques.
- 20.0 Demonstrate sign illumination techniques.
- 21.0 Demonstrate techniques for applying paints and coatings for surface finishes.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D (300 Hours)

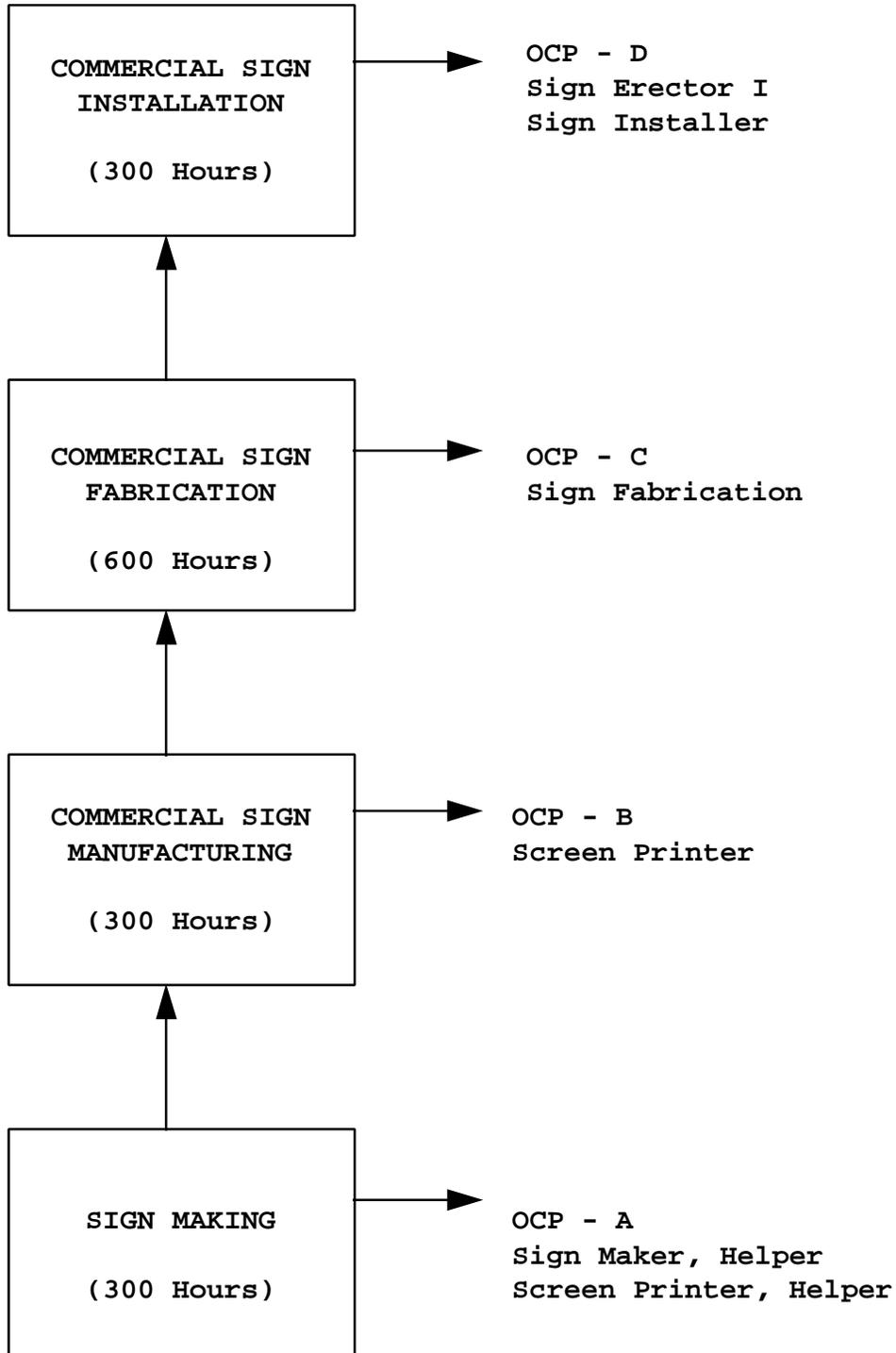
SIGN ERECTOR I - DOT 869.381-026

SIGN INSTALLER

- 22.0 Demonstrate field safety techniques.
- 23.0 Read and interpret installation drawings and blueprints.
- 24.0 Identify, select and use installation tools and field equipment.
- 25.0 Apply basic engineering principles.
- 26.0 Demonstrate safe rigging operations.
- 27.0 Demonstrate installation techniques.
- 28.0 Apply field electrical wiring procedures.
- 29.0 Demonstrate maintenance and repair techniques.
- 30.0 Demonstrate employability skills.

The following diagram illustrates the program structure:

COMMERCIAL SIGN DESIGN AND FABRICATION



July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Sign Design And Fabrication
Secondary Number:
Postsecondary Number: I480202
CIP Number: 0648.029900

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (300 Hours)
SIGN MAKER, HELPER - INDUSTRY TITLE
SCREEN PRINTER, HELPER - DOT 979.687-022

01.0 APPLY BASIC TRADE AND SAFETY SKILLS--The student will be able to:

- 01.01 Apply safety skills.
- 01.02 Identify types of art materials.
- 01.03 Use and care of tools.
- 01.04 Maintain presentational portfolio.
- 01.05 Apply effective business practices including estimation of costs and defining differences in production processes.

02.0 APPLY BASIC LETTERING APPLICATION--The student will be able to:

- 02.01 Identify appropriate materials for sign faces.
- 02.02 Identify appropriate materials for lettering application.
- 02.03 Demonstrate lettering application techniques (including vinyl's and screening).
- 02.04 Produce lettered signs using appropriate materials and techniques.

03.0 DEMONSTRATE BASIC SIGN MAKING TECHNIQUES--The student will be able to:

- 03.01 Produce signs on poster board.
- 03.02 Produce cloth and paper banners.
- 03.03 Produce signs on wood, metal and glass faces.
- 03.04 Produce signs on acrylics and polycarbon.
- 03.05 Produce sandblasted, routed and engraved signs.
- 03.06 Produce foam sign.

04.0 DEMONSTRATE BASIC DESIGN SKILLS--The student will be able to:

- 04.01 Apply principles and elements of design.
- 04.02 Render a color wheel.
- 04.03 Draw using one- and two-point perspective.
- 04.04 Analyze drawing to determine proportion.

05.0 DEMONSTRATE USE OF COMPUTER DESIGN SOFTWARE--The student will be able to:

- 05.01 Perform basic computer software operations.
- 05.02 Operate industry specific computer aided design software (i.e. Gerber Scientific Products, Casmate, Flexi-Sign).
- 05.03 Describe computer design applications for sign manufacturing.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 06.01 Conduct a job search.
- 06.02 Secure information about a job.
- 06.03 Identify documents, which may be required when applying for a job.
- 06.04 Complete a job-application form.

- 06.05 Demonstrate competence in job interview techniques.
- 06.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 06.07 Identify and adopt acceptable work habits.
- 06.08 Demonstrate knowledge of how to make job changes appropriately.
- 06.09 Demonstrate acceptable employee health habits.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (300 Hours)

SIGN MAKER - INDUSTRY TITLE

SCREEN PRINTER - DOT 979.684-034

07.0 PREPARE LAYOUTS AND ILLUSTRATIONS--The student will be able to:

- 07.01 Layout thumbnails and roughs.
- 07.02 Layout color comprehensives.
- 07.03 Prepare finished illustrations.
- 07.04 Prepare architectural scale drawings.
- 07.05 Produce sign layouts.

08.0 DEMONSTRATE BASIC SILK-SCREENING TECHNIQUES--The student will be able to:

- 08.01 Produce silk-screen prints using cut stencil, one color.
- 08.02 Produce silk-screen prints using cut stencil, multicolor.
- 08.03 Produce silk-screen prints using photo stencil, one color.
- 08.04 Produce silk-screen prints using photo stencil, one color halftone.
- 08.05 Produce silk-screen prints using photo stencil, multicolor.

09.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

- 09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 09.02 Demonstrate the ability to use measuring tools and scales.
- 09.03 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 09.04 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 09.05 Read and convert English system and metric system measurements.
- 09.06 Use decimal metric equivalents charts, tap drill sizes for American standards threads charts drill size decimal equivalent charts, American standard wrench nuts and bolts charts, mechanical fasteners charts and assembly devices charts.

10.0 DEMONSTRATE APPLIED COMMUNICATION SKILLS--The student will be able to:

- 10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 10.03 Read and follow written and oral instructions.
- 10.04 Answer and ask questions coherently and concisely.
- 10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 10.06 Demonstrate appropriate telephone/communication skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (600 Hours)
SIGN FABRICATOR - INDUSTRY TITLE

11.0 APPLY BASIC SHOP AND SAFETY SKILLS--The student will be able to:

- 11.01 Clean and maintain work area in a safe condition.
- 11.02 Apply policies and procedures for safety, including fire safety.
- 11.03 Identify and operate workplace-safety electrical devices.
- 11.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.05 Demonstrate procedures for disaster situations.
- 11.06 Demonstrate the proper use and care of hand and power tools and equipment.
- 11.07 Describe service-truck maintenance and loading procedures.
- 11.08 Identify rigging procedures, including hand signals.
- 11.09 Organize storage areas on site.
- 11.10 Demonstrate knowledge of CPR (cardiopulmonary resuscitation) and first aid.

12.0 DEMONSTRATE BASIC APPLIED SCIENCE SKILLS--The student will be able to:

- 12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 12.02 Draw conclusions or make inferences from data.
- 12.03 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 READ AND INTERPRET SHOP DRAWINGS, DIAGRAMS, SCHEMATICS AND BLUEPRINTS--The student will be able to:

- 13.01 Interpret basic elements of a drawing or sketch.
- 13.02 Use working drawings, which include detail and assembly drawings.
- 13.03 Use and interpret information on exterior views, sectional views, auxiliary views, balloon drawings, pictorial drawings, explode views, perspective drawings and projection drawings.
- 13.04 Determine accuracy of information on working drawings.
- 13.05 Take off materials list from working drawings to calculate totals for production.

14.0 APPLY BASIC ENGINEERING DESIGN PRINCIPALS--The student will be able to:

- 14.01 Incorporate code requirements and sign ordinances into design.
- 14.02 Identify and apply sign structural support specifications.
- 14.03 Identify and apply wind load factors.
- 14.04 Incorporate appropriate sign construction technique into design.

15.0 APPLY BASIC METAL CUTTING AND WELDING PRINCIPLES AND PROCEDURES--The student will be able to:

- 15.01 Demonstrate welding safety procedures.
- 15.02 Identify metal types prior to welding.
- 15.03 Setup, operate and maintain metal inert gas (MIG) welding equipment.

- 15.04 Perform various welds with MIG equipment including plug, butt and lap.
 - 15.05 Setup and maintain oxyacetylene welding equipment.
 - 15.06 Explain various welding, cutting and heating techniques with oxyacetylene equipment.
 - 15.07 Describe plasma cutting.
 - 15.08 Perform various welds using aluminum.
 - 15.09 Explain electric compression spot welding.
 - 15.10 Setup, operate and maintain Tungsten Inert Gas (TIG) welding equipment.
 - 15.11 Setup and perform plasma cutting operations.
- 16.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:
- 16.01 Identify specification(s) of metals used in sign manufacturing.
 - 16.02 Identify heat effects on metals.
 - 16.03 Identify the importance of maintaining structural integrity.
 - 16.04 Demonstrate proficiency in operating and maintaining sheet metal tools and equipment.
 - 16.05 Demonstrate techniques for cutting and bending metals.
 - 16.06 Demonstrate fastener and welding techniques for sign cabinet construction.
 - 16.07 Identify appropriate applications for extrusion and "skin-and-frame" sign cabinet construction.
 - 16.08 Build an extruded sign cabinet.
 - 16.09 Build a "skin-and-frame" sign cabinet.
- 17.0 DEMONSTRATE THE PROCESSES NECESSARY TO MANUFACTURE AND FINISH PLASTIC SIGN FACES--The student will be able to:
- 17.01 Identify tools, equipment and materials used in the manufacturing of plastic sign faces.
 - 17.02 Demonstrate die-, mold- and pattern-making techniques.
 - 17.03 Design patterns and molds to produce sign faces using the vacuum forming process.
 - 17.04 Set up and operate thermal forming equipment.
 - 17.05 Apply assembly and finishing techniques to produce a sign face.
- 18.0 DEMONSTRATE PACKING, CRATING AND SHIPPING TECHNIQUES--The student will be able to:
- 18.01 Identify crating requirements for various shipping methods.
 - 18.02 Identify techniques for protecting finished products.
 - 18.03 Identify appropriate materials and techniques for packing and crating.
 - 18.04 Set-up and operate tools necessary for building crates.
 - 18.05 Demonstrate safety procedures to prevent lifting injuries.
- 19.0 DEMONSTRATE ELECTRICAL WIRING SKILLS AND TECHNIQUES--The student will be able to:
- 19.01 Define the terms "voltage," "resistance," "power," and energy."
 - 19.02 Measure voltage, amperage and resistance, using a volt-ohm meter (VOM) and a digital volt-ohm meter (DVM).
 - 19.03 Analyze, construct and troubleshoot a series, series-parallel, and parallel circuit.
 - 19.04 Draw each type of circuit and calculate the circuit values.
 - 19.05 Demonstrate Proficiency in testing and connecting a transformer.
 - 19.06 Apply the principles of transformers to ACA circuits.

- 19.07 Connect, analyze and troubleshoot power and control transformers according to the appropriate local, state or national electrical codes.
- 19.08 Install sign cabinet DC electrical wiring.
- 19.09 Install sign cabinet AC electrical wiring.
- 19.10 Connect electrical sign to electrical source according to appropriate electrical codes.

20.0 DEMONSTRATE SIGN ILLUMINATION TECHNIQUES--The student will be able to:

- 20.01 Demonstrate illumination using florescent, incandescent and neon fixtures.
- 20.02 Identify industry standards and resources for illumination design.
- 20.03 Identify appropriate design applications for florescent, incandescent and neon illumination.
- 20.04 Demonstrate appropriate placement and spacing for florescent illuminated sign cabinets.

21.0 DEMONSTRATE TECHNIQUES FOR APPLYING PAINTS AND COATINGS FOR SURFACE FINISHES--The student will be able to:

- 21.01 Prepare surfaces for coating applications according to manufacturer's recommendations.
- 21.02 Mask and protect other areas that will not be coated.
- 21.03 Mix and apply primer or primer surfacer and primer.
- 21.04 Correct minor surface imperfections.
- 21.05 Select proper abrasives and dry or wet sand area to which primer-surfacer and glazing putty have been applied.
- 21.06 Remove dust from areas to be coated.
- 21.07 Determine when sealing is needed or desirable and apply suitable sealer to the area being coated.
- 21.08 Scuff sand to remove nibs or overspray from a sealer.
- 21.09 Select the proper spray mask; inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.
- 21.10 Measure, shake, stir, thin or reduce, and strain paint.
- 21.11 Verify color match before applying and adjust if needed.
- 21.12 Apply various coating systems for spot, panel and overall finishing.
- 21.13 Sand, buff and polish finishes.
- 21.14 Clean and detail sign after completion of coating application.
- 21.15 Properly dispose of hazardous waste.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D (300 Hours)

SIGN ERECTOR - DOT 869.381-026

SIGN INSTALLER

22.0 DEMONSTRATE FIELD SAFETY TECHNIQUES--The student will be able to:

- 22.01 Identify common causes of accidents involving sign installations.
- 22.02 Discuss the importance of following proper safety precautions during sign installation.
- 22.03 Apply sign installation safety procedures and precautions.
- 22.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and explain the proper precautions required for handling such materials.
- 22.05 Demonstrate the procedures of basic first-aid and cardiopulmonary resuscitation (CPR).

22.06 Explain Occupational Safety and Health Administration (OSHA) rules and regulations.

- 23.0 READ AND INTERPRET INSTALLATION DRAWINGS AND BLUEPRINTS--The student will be able to:
- 23.01 Identify the different types of drawings and blueprints.
 - 23.02 Identify and interpret blueprint symbols, abbreviations, markings and details.
 - 23.03 Translate a blueprint into a sign installation.
 - 23.04 Draw conclusions, problem-solve or make inferences from blueprints and drawings.
- 24.0 IDENTIFY, SELECT AND USE INSTALLATION TOOLS AND FIELD EQUIPMENT--The student will be able to:
- 24.01 Identify the tools and equipment used for various types of sign installation.
 - 24.02 Select and safely use the tools and equipment necessary for a specific installation.
 - 24.03 Service, maintain and store tools and equipment.
 - 24.04 Use equipment manuals.
- 25.0 APPLY BASIC ENGINEERING PRINCIPLES--The student will be able to:
- 25.01 Assess foundation needs for pole or column sign installation.
 - 25.02 Identify wind load variables.
 - 25.03 Identify reinforcement specifications for foundation requirements.
 - 25.04 Determine suitability of existing foundation for reinstallation procedures.
 - 25.05 Demonstrate knowledge of fastener applications.
 - 25.06 Identify manufacturer resources for fastener load specifications.
- 26.0 DEMONSTRATE SAFE RIGGING OPERATIONS--The student will be able to:
- 26.01 Identify rigging hardware and its proper uses.
 - 26.02 Set up scaffolding for sign installation operation.
 - 26.03 Describe the safe operation of boom truck.
 - 26.04 Describe the safe operation of a bucket truck.
 - 26.05 Compute the mechanical advantages of rigging procedures.
 - 26.06 Identify the center of gravity and picking points for heavy loads.
 - 26.07 Identify the methods of hoisting heavy loads correctly into place.
 - 26.08 Perform a rigging operation for sign installation.
- 27.0 DEMONSTRATE INSTALLATION TECHNIQUES--The student will be able to:
- 27.01 Identify the various sign installation techniques.
 - 27.02 Identify the appropriate materials and equipment necessary for various sign installations.
 - 27.03 Apply appropriate sign installation techniques for a specific sign installation.
 - 27.04 Apply appropriate rigging techniques.
 - 27.05 Demonstrate an awareness of code and permitting requirements.
- 28.0 APPLY FIELD ELECTRICAL WIRING PROCEDURES--The student will be able to:
- 28.01 Describe related electrical code applications.
 - 28.02 Identify on-site electrical safety considerations.
 - 28.03 Describe electrical licensure requirements for hardwiring to electrical service.
 - 28.04 Describe pre-connection procedures and requirements.

- 28.05 Identify ballast installation requirements for florescent illumination.
 - 28.06 Describe incandescent illumination installation procedures.
- 29.0 DEMONSTRATE MAINTENANCE AND REPAIR TECHNIQUES--The student will be able to:
- 29.01 Identify tools and equipment necessary for sign maintenance and repair.
 - 29.02 Troubleshoot and repair electrical and illumination malfunctions.
 - 29.03 Repair or replace damaged sign faces.
 - 29.04 Assess structural support and fastener systems.
 - 29.05 Determine appropriate cabinet refinishing technique.
- 30.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:
- 30.01 Define entrepreneurship.
 - 30.02 Describe the importance of entrepreneurship to the American economy.
 - 30.03 List the advantages and disadvantages of business ownership.
 - 30.04 Identify the necessary personal characteristics of a successful entrepreneur.