Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Welding Technology

Course Number: 00910 (AM) & 00960 (PM)

Course Prerequisites: A student should have earned at least six (6) credits to be enrolled in Welding Technology

Course Description:
48.0508 Welding Technology/Welder. Students in the Welding Technology Program will learn: Occupational Orientation and safety principles of welding, welding drawing, weld symbol interpretations, visual examination, inspection, testing, shielded metal arc welding, gas metal arc welding (GMAW), flux cord arc welding (FCAW), flux cored art welding (FCAW), submerged arc welding (SAW), gas tungsten arc welding (GTAW), manual oxy-fuel gas cutting (OFC), mechanized oxy-fuel gas cutting (OFC), manual plasma arc cutting (PAC), manual air carbon arc cutting (CAC-A), brazing, soldering and job seeking/job keeping skills. All instruction and student learning activities are aligned with the American Welding Society (AWS) standards. Following AWS Standards, some students are expected to perform guided bend tests. These standards and procedures are commonly used in local and national industries. Students will need to pass these types of tests in order to gain employment in industry. Students learn all the theories related to the above-mentioned welding process, as well as, an introduction to welding symbols.

Suggested Grade Level: **Grades 10-12**

Length of Course: _____ One Semester X Two Semesters _____ Other (Describe)

Units of Credit: Three (3) Elective credits per year [up to nine (9) credits with Optional COOP]

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s): CSPG #13: Emergency Certification, #66: Vocational Instruction & Vocational Intern Certification, #7: Level II (Permanent Certification), Code: 2079 Welding Occupational Competency Area

Certification verified by WCSD Human Resources Department:
X Yes _____ No

Board Approved Textbooks, Software, Materials:
Title: WHB 2.9 Welding Handbook Volume 2 – Part 1: Welding Processes
Publisher: American Welding Society
ISBN #: 0-87171-729-8
Copyright Date: 2004
Date of WCSD Board Approval: March 13, 2017

BOARD APPROVAL:

Date Written: February 13, 2017

Date Approved: March 13, 2017

Implementation Year: 2017 – 2018

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

COURSE OUTLINE

List the units to be taught throughout the course. Provide a brief description of what will be taught in each unit.

For standards, essential questions, content, and skills see Curriculum Map –

PA Academic Standards: Aligned with PA Standards
Career, Education and Work – 13.1.11A, C, D, 13.2.11A, B, G, 13.3.11A, B, C, D, E, F, G, 13.4.11A, B, C
Science and Technology – 3.04.10B, 3.04.12B, 3.07.10A
Math – 2.01.08A, 2.02.08B, 2.03.08C, 2.03.11C, 2.04.11E
Reading – 1.2.11
American Welding Society (AWS) Standards

REQUIRED COURSE SEQUENCE AND TIMELINE:
Outline of Content Sequence and Recommended Time (36 weeks/per year– 108 weeks/3 years)

Over the three (3) years of the course, individual instruction and student activities are on-going and developmental in the welding processes given below:

(100) Occupational Orientation and Safety **4 weeks/20 days/50 hours**

- Prepare and mark time or job sheet, reports or records
- Perform housekeeping duties daily
- Follow verbal instructions to complete work assignments and rules
- Follow written instructions to complete work assignments and rules
- Demonstrate proper use and inspection of Personal Protection Devices)
- Demonstrate proper work area operation
- Discuss proper use of ventilation equipment
- Discuss proper Hot Zone operation
- Understand proper work actions for working in confined spaces
- Understand MSDA sheets and precautionary labeling
- Demonstrate proper use and inspection equipment used for each required welding and thermal cutting process
- Display familiarity with industrial and OSHA safety standards
- Demonstrated knowledge of oxy-fuel safety procedures
- Demonstrate knowledge of arc welding safety procedures
- Demonstrate emergency action plan

(200) Principles of Welding **3 weeks/15 days/37.5 hours**

Identify major types of metals (ferrous/non-ferrous) used in welding
Describe the basic principles of heat, expansion and contraction as it relates to metals
Select appropriate welding technique, equipment and supplies for a given metal or process
Describe the industry accepted welding codes, standards and procedures and their use.
Identify various joint designs (joint geometry)
Clean and prepare materials for welding and/or cutting
Use hand tools and power equipment use standard measuring and layout tools
Calculate materials lists and costs

(300) Welding Drawing and Weld Symbol Interpretation **3 weeks/15 days/37.5 hours**

Interpret basic elements of drawing or sketch
Interpret welding symbol information
Fabricate parts from a drawing or sketch
Identify structural metals used in the Metal Fabrication field
Demonstrate knowledge of basic metric conversion
Calculate materials lists and costs.

(400) Visual Examination, Inspection and Testing **2 weeks/10 days/25 hours**

Evaluate cut surfaces and edges of prepared base metal parts for testing
Identify and evaluate weld discontinuities as per accept/reject criteria

(500) Shielded Metal Arc Welding (SMAW) **18 weeks/90 days/225 hours**

Performa safety inspections of SMAW equipment and accessories
Make minor external repairs to SMAW equipment and accessories
Set up and operate SMAW equipment
Make fillet welds in all positions
Make groove welds in all positions
Perform pipe welds in all positions
Pass performance test in all positions
Perform qualification test

(600)Gas Metal Arc Welding (GMAW) **19 weeks/95 days/237.5 hours**

Perform safety inspections of GMAW equipment and accessories
Make minor external repairs to GMAW equipment and accessories
Set up and operate GMAW equipment
Make fillet welds in all positions
Make groove welds in all positions
Perform pipe welds in all positions
Pass performance test

(700) Flux Cored Arc Welding (FCAW) **19 weeks/95 days/237.5 hours**

Perform safety inspections of Flux cored Arc equipment and accessories
Make minor external repairs to Flux cored Arc equipment and accessories
Set up and operate FCAW equipment
Make fillet welds in all positions
Make groove welds in all positions
Perform pipe welds in all positions
Pass performance test

(800) Submerged Arc Welding (SAW) **3 weeks/15 days/37.5 hours**

Perform safety inspections of SAW equipment and accessories

Make minor external repairs to SAW equipment and accessories
Set up and operate SAW equipment
Make groove welds, flat and horizontal positions in all positions
Pass performance test

(900) Gas Tungsten Arc Welding (GTAW) **18 weeks/90 days/225 hours**

Perform safety inspections of GTAW equipment and accessories
Make minor external repairs to GTAW equipment and accessories
Set up and operate GTAW equipment
Make fillet welds in all positions on ferrous materials
Pass performance test on ferrous materials
Make fillet welds on non-ferrous materials
Pass performance test on non-ferrous materials

(1000) Manual Oxy-Fuel Gas Cutting **4 weeks/20 days/50 hours**

Perform safety inspections of OFC equipment and accessories
Make minor external repairs to OFC equipment and accessories
Set up and operate OFC equipment on steel
Perform straight cutting operations on steel
Perform bevel cutting operations on steel
Perform piercing operations on steel

(1100) Mechanized Oxy-Fuel Gas Cutting (OFC) **4 weeks/20 days/50 hours**

Perform safety inspections of mechanized OFC equipment and accessories
Make minor external repairs to mechanized OFC equipment and accessories
Set up and operate OFC equipment on steel
Perform straight cutting operations on steel
Perform bevel cutting operations on steel

(1200) Manual Plasma Arc Cutting (PAC) **2 weeks/10 days/25 hours**

Perform safety inspections of PAC equipment and accessories
Make minor external repairs PAC equipment and accessories
Set up and operate manual PAC equipment on ferrous and non-ferrous materials
Perform straight cutting operations on ferrous and non-ferrous materials

(1300) Manual Air Carbon Arc Cutting (CAC-A) **4 weeks/20 days/50 hours**

Perform safety inspections of CAC-A equipment and accessories
Make minor external repairs to CAC-A equipment and accessories
Set up and operate manual CAC-A gouging and cutting operations on steel
Perform gouging and scarfing operations to remove base and weld metal on steel

(1400) Brazing and Soldering **2 weeks/10 days/25 hours**

Set up and operate oxy-fuel brazing and soldering equipment
Perform brazing and soldering operations

(1500) Job Seeking/Job Keeping **3 weeks/15 days/37.5 hours)**

See PA Standards above

Total **108 weeks/540 days1350 hours**

COOP **36 weeks (optional)**

ASSESSMENT

Summative Assessments: NOCTI Written and Performance Test (2nd or 3rd year students) developed by the National Occupational Competency Testing Institute. Students who score advanced will receive the PA Skills Certificate in Welding Technology signed by the Governor of Pennsylvania. Students who score advanced and successfully complete the Program of Study Task Grid will earn SOAR PA state-wide articulated credit and any additional approved articulated college credit.

Formative Assessments: The teacher will develop and use standards-based assessments throughout the program.

Portfolio Assessment: _____ Yes __X__ No

District-wide Common Final Examination Required: __X__ Yes _____ No

Course Challenge Assessment (Describe): **N/A**

WRITING TEAM: Nathan McNett and James Evers and reviewed by current School Board approved OAC Membership

WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? __X__ Yes _____ No
   Warren County School District Policy 9741 and 9744 state, "All classes in grades 9-12 shall have a final exam".
2. Does this course issue a mark/grade for the report card?
   __X__ Yes _____ No
3. Does this course issue a Pass/Fail mark? _____ Yes __X__ No
4. Is the course mark/grade part of the GPA calculation?
   __X__ Yes _____ No
5. Is the course eligible for Honor Roll calculation? __X__ Yes _____ No
6. What is the academic weight of the course?
   _____ No weight/Non credit __X__ Standard weight
   _____ Enhanced weight (Describe) AP