Texas CTE

Introduction to Welding

General requirements. This course is recommended for students in Grades 9-12. Recommended prerequisite or corequisite: Algebra I. Students shall be awarded one credit for successful completion of this course. W.A

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Introduction. W.B

1 **Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.** W.B.1

2 **The Manufacturing Career Cluster focuses on planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering** W.B.2

3 **Introduction to Welding will provide an introduction to welding technology with an emphasis on basic welding laboratory principles and operating procedures. Students will be introduced to the three basic welding processes. Topics include: industrial safety and health practices, hand tool and power machine use, measurement, laboratory operating procedures, welding power sources, welding career potentials, and introduction to welding codes and standards. Introduction to Welding will provide students with the knowledge, skills, and technologies required for employment in welding industries. Students will develop knowledge and skills related to welding and apply them to personal career development. This course supports integration of academic and technical knowledge and skills. Students will reinforce, apply, and transfer knowledge and skills to a variety of settings and problems. Knowledge about career opportunities, requirements, and expectations and the development of workplace skills will prepare students for future success.** W.B.3

4 **Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.** W.B.4

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5 **Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.** W.B.5

Knowledge and skills. W.C

1 **The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:** W.C.1

- a express ideas to others in a clear, concise, and effective manner through written and verbal communication; W.C.1.A
- b demonstrate acceptable work ethics in reporting for duty and performing assigned tasks as directed; W.C.1.B
- c conduct oneself in a manner acceptable for the profession and work site such as suitable dress and polite speech; W.C.1.C
- d choose ethical courses of action such as following applicable rules, laws, and regulations; W.C.1.D
- e review detailed aspects of both quantitative and qualitative work processes and end products; W.C.1.E
- f evaluate systems relative to causes, problems, and patterns to improve operational situations; W.C.1.F
- g adhere to business practices such as policies, procedures, and health and safety rules; W.C.1.G
- h use time wisely by prioritizing tasks and following schedules in an efficient manner. W.C.1.H

2 **The student explores the characteristics of a successful worker in the global economy. The student is expected to:** W.C.2

- a determine academic knowledge and skills required for postsecondary education; W.C.2.A
- b identify employers' expectations to foster positive customer satisfaction; W.C.2.
- c demonstrate the professional standards required in the workplace such as interviewing skills, flexibility, willingness to learn new skills and acquire knowledge, self-discipline, self-worth, positive attitude, and integrity in a work situation; W.C.2.C
- d evaluate progress toward personal career goals; W.C.2.D
- e communicate effectively with others in the workplace to clarify objectives; W.C.2.E
- f apply knowledge and skills to health and safety in the workplace as specified by appropriate governmental regulations. W.C.2.F

3 **The student evaluates the function and application of the tools, equipment, technologies, and materials used in welding. The student is expected to:** W.C.3

- employ welding equipment according to safety standards; W.C.3.A
- identify and properly dispose of environmentally hazardous materials used in welding; W.C.3.B

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c explain the importance of recycling materials used in welding; W.C.3.

d choose appropriate personal protective equipment; W.C.3.D

e evaluate skills related to health and safety in the workplace as specified by appropriate governmental regulations. W.C.3.E

4 The student compares and contrasts welding joint design, material symbols, and welds. The student is expected to: W.C.4

a demonstrate knowledge of welding sketches; W.C.4.A

b identify types of welds such as fillet, groove, spot, plug, and flanged. W.C.4.B

5 The student applies academic skills in relationship to welding. The student is expected to: W.C.5

a demonstrate mathematical skills related to welding; W.C.5.A

b demonstrate technical writing skills related to welding; W.C.5.B

c apply accurate readings of measuring devices; W.C.5.C

d accurately use appropriate tools to make measurements; W.C.5.D

e solve problems using whole numbers, fractions, mixed numbers, and decimals; W.C.5.E

f perform conversions between fractions and decimals; W.C.5.F

g perform conversions between standard units and metric units. W.C.5.G

6 The student applies the concepts and skills of welding projects. The student is expected to: W.C.6

a explore careers in welding; W.C.6.A

b understand welding codes such as American Petroleum Institute (API) 1104 and American Welding Society (AWS) D1.1; W.C.6.B

c work independently to fabricate a variety of welded projects with minimal assistance; W.C.6.C

d work collaboratively with other students. W.C.6.D

7 The student performs oxy-fuel cutting processes on carbon steels. The student is expected to: W.C.7

a use safe operating practices; W.C.7.A

b perform safe handling of compressed gases; W.C.7.B

c identify components of oxy-fuel gas cutting; W.C.7.C

d demonstrate proper set-up procedures for the oxy-fuel process; W.C.7.D

e identify the factors affecting the oxy-fuel cutting of base metals; W.C.7.E

f demonstrate proper cutting techniques such as piercing, straight line, and bevel; W.C.7.F

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8 **The student understands the opportunities and careers in fields related to electrical and mechanical systems. The student is expected to:** W.C.8

- a describe the applications of electrical and mechanical systems; W.C.8.A
- b describe career opportunities in electrical and mechanical systems; W.C.8.B
- c identify emerging trends in electrical and mechanical systems; W.C.8.C
- d describe and apply basic electronic theory. W.C.8.D

9 **The student demonstrates the ability to function as a team member while completing a comprehensive project. The student is expected to:** W.C.9

- a apply the design process as a team participant W.C.9.A
- b assume different roles as a team member within the project; W.C.9.B
- c maintain an engineering notebook for the project; W.C.9.C
- d develop and test the model for the project; W.C.9.D
- e demonstrate communication skills by preparing and presenting the project W.C.9.E

10 **The student demonstrates a knowledge of drafting by completing a series of drawings that can be published by various media. The student is expected to:** W.C.10

- a set up, create, and modify drawings; W.C.10.A
- b store and retrieve geometry; W.C.10.B
- c demonstrate an understanding of the use of line-types in engineering drawings; W.C.10.C
- d draw 2-D single view objects; W.C.10.D
- e create multi-view working drawings using orthographic projection; W.C.10.E
- f dimension objects using current American National Standards Institute (ANSI) standards; W.C.10.F
- g. draw single line 2-D pictorial representations; W.C.10.G
- h create working drawings that include section views; W.C.10.H
- i demonstrate a knowledge of screw thread design per ANSI standards by drawing a hex head bolt with standard, square, and acme threads. W.C.10.I