

Course ID	Course Name	Course Outcome
AIRC 10	Technical Mathematics in Air Conditioning and Refrigeration	<p>Course completers will apply Fan Laws to assess and successfully adjust air flow</p> <p>Course completers will be able to determine the correct refrigerant charge of a non-critically charged system based on receiver design.</p>
AIRC 11	Welding for Air Conditioning and Refrigeration	<p>Course completers will safely operate welding equipment.</p> <p>Course completers will successfully join refrigerant lines.</p>
AIRC 12	Air Conditioning Codes and Standards	<p>AIRC 12 course completers will be able to apply building codes to the installation of air conditioning and refrigeration equipment.</p> <p>Course completers will understand the structure and organization of the Uniform Mechanical Code</p>
AIRC 20	Refrigeration Fundamentals	<p>AIRC 20 course completers will evaluate the mechanical operation of an air conditioning system.</p> <p>AIRC 20 course completers will properly handle refrigerants</p>
AIRC 25	Electrical Fundamentals for Air Conditioning and Refrigeration	<p>AIRC 25 Course completers will understand the electrical sequence of operation for a five ton air conditioning system.</p> <p>Course completers will successfully use electrical meters commonly used in the Air Conditioning and Refrigeration industry.</p>
AIRC 26	Gas Heating Fundamentals	<p>AIRC 26b course completers will correctly evaluate the sequence of operation for a high efficiency furnace.</p> <p>AIRC 26B course completers will properly evaluate furnace installations</p>
AIRC 30	Heat Load Calculations and Design	<p>AIRC 30 course completers will properly conduct a Heat Load calculation</p> <p>Course completers will properly select air conditioning equipment</p>
AIRC 31	Commercial Electrical for Air Conditioning and Refrigeration	<p>Completers will understand electrical sequence of operations of commercial refrigeration equipment.</p> <p>Students will monitor proper phasing for 3 phase power</p>
AIRC 32A	Air Properties and Measurement	<p>AIRC 32a course completers will evaluate the operation of an air conditioning system based on the treatment of air across the evaporator.</p>

		Course completers will be able to determine make-up air requirements for various commercial applications
AIRC 34	Advanced Mechanical Refrigeration	AIRC 34 course completers will evaluate the operation of a commercial refrigeration system AIRC course completers will modify the operation of a commercial refrigeration system.
AIRC 61	Building Automation Fundamentals	AIRC 61 completers will understand the operation and function of the major components of a Central Plant. Method of Evaluation: Students will properly identify the major components that are critical to a Central Plant. AIRC 61 course completers will understand the application and use of general purpose controllers and application specific controllers.
AIRC 65	Building Automation Networks and Programming	AIRC 65 completers will successfully understand the setup procedure for a general purpose controller.
AIRC 67	Energy Management	AIRC 67 completers will successfully understand the proper use and application of a light level meter. AIRC 67 completers will understand the design of an energy model.
AIRC 95	Work Experience in Air Conditioning and Refrigeration	Employers of Air Conditioning and Refrigeration Work Experience Students will rate the work habits of their students as above average. Employers of Work Experience students will rate the technical skills of AIRC students as above average.
WELD 30	Metal Sculpture	Students will be able to differentiate between good and bad welds. Students will be able to identify a variety of welding processes that are used in effective bonding of metals Students will be able to solve problems related to building forms. Students will demonstrate skills on how to properly use and maintain tools used in polishing and finishing material.
WELD 40	Introduction to Welding	Completers will be able to successfully identify and differentiate between various welding processes presented in the class. Completers will be able to successfully identify and differentiate between various welding processes presented in the class. (SLO)

Define terms and conditions related to the welding industry. (MO)
Demonstrate the use of Oxy-acetylene welding (OAW),Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding(GMAW),Gas Tungsten Arc Welding (GTAW),Flux Cored Arc Welding (FCAW), Plasma Arc Cutting (PAC),Carbon Arc Cutting(CAC) principles to join and cut metals. (MO)
Discuss the different base metal compositions used to make metallurgical bonds. (MO)
Identify the cost effectiveness of each welding process. (MO)
Incorporate safety practices into all welding activities. (MO)
Recognize and describe common welding processes used in bonding metals. (MO)

Recognize and illustrate basic metallurgy related to the welding trades. (MO)
students will be able to effectively operate the equipment for various welding processes .
Students will be able to effectively operate the equipment for various welding processes. (SLO)

WELD 50

Oxyacetylene Welding

Calculate the time required to complete quality welding used with the oxyacetylene process. (MO)
Demonstrate appropriate maintenance of welding equipment in the work place. (MO)
Demonstrate skill in oxyacetylene welding. (MO)
Each student use proper names of equipment and supplies used in oxyfuel welding

Explain and demonstrate safe and efficient operation of welding equipment. (MO)

Students will be able to identify the characteristics of metals and their reaction to welding processes.
Students will be able to recognize problems of gas fluctuation in welding and cutting operations.
Use and interpret charts to select filler material. (MO)

WELD 51 (VOC)

Basic Electric Arc Welding

Apply safety principles in arc welding procedures. (MO)
Calculate times required to complete quality welding used with the electric arc welding processes. (MO)
Demonstrate and describe how to set electric arc welding machines using gas metal arc, shield metal arc, gas tungsten arc and the flux cored arc welding processes. (MO)

Demonstrate daily maintenance of a safe work place environment. (MO)
Each student will demonstrate knowledge of which process is most commonly used for different aspects of the welding and what advantage it will provide to that aspect of the industry
Explain and demonstrate safe and efficient operation of welding equipment.
(SLO/MO)
Students will be able to demonstrate a variety of electric welding processes used in bonding metals.
Students will be able to use reference charts to select filler material
Students will demonstrate safe operation of welding equipment.

Use a vocabulary of terms and conditions related to the welding trades. (MO)
Use and interpret reference charts to select filler material. (SLO/MO)
Utilize different types of power sources used for welding in shield metal arc, gas metal arc, gas tungsten arc and flux cored arc welding processes. (MO)

WELD 53A (VOC) Welding Metallurgy

Compare and contrast the cause of deformation on welded metals. (MO)
Describe effects of alloying metals in relationship to a welding procedure. (MO)

Describe nature of metals and the relationship between their structural and mechanical properties. (MO)
Examine the purpose of pre- and post-heat treatments on welded metals. (MO)

Identify crystal structure of metals and their changes in heat treatment processes. (MO)
Interpret iron-carbon relationship and its effect on welding of ferrous metals. (MO)

Recognize effects of alloying materials in ferrous and non-ferrous metals. (MO)

Students will be able to explain the use of metallurgy tools and equipment as a means of determining weld soundness.
Students will explain the industrial processes of manufacturing ferrous and non-ferrous metals.
Students will run hardness tests and other assessments means to understand how grain structure relates to strength and ductility of metals.
Utilize metallurgy tools and equipment as a means of determining weld soundness.
(SLO/MO)

WELD 60 (VOC)	Print Reading and Computations for Welders	<p>Assess bills of materials, weights and lengths of materials. (MO)</p> <p>Calculate with fractions, decimals, and metrics by converting and manipulating. (SLO/MO)</p> <p>Create objects from print drawings. (MO)</p> <p>Demonstrate concepts of views by sketching objects. (MO)</p> <p>Identify and define print notes and specifications. (MO)</p> <p>Identify welding symbols on prints and objects. (MO)</p> <p>Illustrate revolved sections of objects. (MO)</p> <p>Interpret detail and assembly prints. (MO)</p> <p>Recognize and identify structural and pipe shapes and sizes. (MO)</p> <p>Students will be able to calculate with fractions, decimals, and converting between metric and standard units of measure.</p> <p>Students will be able to identify print views, lines and dimensioning methods</p>
WELD 70A (VOC)	Beginning Arc Welding	<p>Differentiate between welding processes and where industry applies them in the workforce. (MO)</p> <p>Select different types of filler materials with the SMAW, FCAW and GMAW processes on plate steel. (MO)</p> <p>Solve problems as related to cutting, preparing and fitting up materials prior to welding. (SLO/MO)</p> <p>Students will be able to perform the required practical projects in the flat and horizontal positions.</p> <p>Students will demonstrate safe usage of welding equipment</p> <p>Students will solve problems as related to cutting materials prior to welding.</p> <p>Students will solve problems as related to preparing materials prior to welding.</p>
WELD 70B (VOC)	Intermediate Arc Welding	<p>Explain safe and efficient operation of welding equipment. (SLO/MO)</p> <p>Interpret charts as a reference to select filler materials for welding. (MO)</p> <p>Students will be able to utilize different welding processing for welding in flat, horizontal, vertical and overhead positions for quality products.</p> <p>Students will demonstrate machine setups for SMAW & FCAW processes.</p> <p>Students will demonstrate safe operation of welding equipment.</p> <p>Use vocabulary of terms and conditions related to the welding trades. (MO)</p>

WELD 70C (VOC)	Certification for Welders	<p>75% of students will pass the L.A. City Department of Building and Safety written exam for Structural Steel Welder certification with a score of 70% or better.</p> <p>Demonstrate proper and safe usage of welding equipment and practices by written and practical tests. (MO)</p> <p>Identify modern welding practices. (MO)</p> <p>Read and interpret welding and building codes in the area of light gauge and heavy material of the construction industry. (MO)</p> <p>Students will be able to compare SMAW and FCAW processes for appropriateness of code welding.</p> <p>Students will evaluate finished welds for defects by visual and bend inspections.</p>
WELD 80 (VOC)	Fabrication and Construction Welding	<p>Accurately measure to one sixteenth of an inch. (MO)</p> <p>Anticipate and solve problems in project fabrication. (MO)</p> <p>Apply principles of identifying base metals and carbon contents of materials used in welding. (MO)</p> <p>Apply welding skills in required practical projects. (MO)</p> <p>Demonstrate proper and safe usage of welding equipment. (MO)</p> <p>Differentiate the theoretical knowledge necessary to run various electrodes and filler metals using the welding processes presented in the class. (MO)</p> <p>Identify materials used in construction and fabrication industry and select the correct filler metals for welding and joining. (MO)</p> <p>Student will be able to select the correct welding applications and processes.</p> <p>Student will be able to select the correct welding applications and processes. (SLO)</p> <p>Students will be able to apply the principles of layout and blueprint reading</p> <p>Students will be able to apply the principles of layout and blueprint reading. (SLO)</p> <p>Students will demonstrate welding skills to industry standards.</p> <p>Students will demonstrate welding skills to industry standards. (SLO)</p>
WELD 81 (VOC)	Pipe and Tube Welding	<p>Demonstrate proper and safe usage of welding equipment and practices. (MO)</p>

Differentiate the positions necessary to run various electrodes and filler metals using welding processes on pipes and/or tubing. (MO)
Identify materials used in pipe and tubing industry and select the correct filler materials for joining. (MO)
Solve problems as related to preparing, layout and fitting up materials prior to welding. (SLO/MO)
Students will be able to apply pipe welding skills in required practical projects.

Students will solve problems as related to preparing materials prior to welding.

WELD 90A (VOC) Gas Tungsten Arc Welding

Demonstrate the application of theoretical knowledge necessary to run different types of filler materials with the GTAW processes on different types of metals. (MO)

Recognize differences between welding processes and their industry applications. (MO)

Students will be able to perform the required practical projects used in GTAW
Students will demonstrate safe usage of welding equipment.

Students will solve problems as related to preparing materials prior to welding

WELD 90B (VOC) Semiautomatic Arc Welding Process

Students will be able to perform the required practical projects used in FCAW.

Students will demonstrate safe usage of welding equipment.
Students will recognize differences between welding processes and their industry applications.

WELD 96 Work Experience in Welding

Employers of Welding Work Experience Students will rate the technical skills of their students as above average.

Employers of Welding Work Experience Students will rate the work habits of their students as above average.