

SHEET METAL

A 5-year, 32.75-credit apprenticeship

Required courses

Credits

First semester

SM 521 Duct Layout 1	1	30 hrs
SM 522 Duct Layout 2	1	30 hrs
SM 571 Fabrication Techniques 1	1	30 hrs
SM 580 Sheet Metal Math 1	1	30 hrs
SM 510 Safety/Orientation	1	30 hrs
Weld 520 Welding Techniques	1	30 hrs
Total semester credits	6	

Second semester

SM 582 Sheet Metal Math 2	1	30 hrs
SM 500 Parallel Line Development	1	30 hrs
SM 572 Fabrication Techniques 2	1	30 hrs
SM 573 Fabrication Techniques 2	1	30 hrs
SM 501 Radial Line Development (intersections)	1	30 hrs
SM 577 Architectural Sheet Metal	1.25	37.5 hrs
Total semester credits	6.25	

Third semester

Weld 527 Wire Welding	1	30 hrs
SM 502 Triangulation 1	1	30 hrs
SM 556 Duct Construction	1	30 hrs
SM 574 Fabrication Techniques 4	1	30 hrs
SM 594 Blueprint Reading 1	1.25	45 hrs
SM 410 Residential SM 1	1.25	45 hrs
Total semester credits	6.50	

Fourth semester

SM 515 Advanced Layout 1 (Join Processes)	1	30 hrs
SM 508 Shop Drawing & Sketching	1	30 hrs
SM 579 Heavy Metal Fab Techs 9	1	30 hrs
SM 575 Fabrication Techniques 5	1	30 hrs
SM 562 Industrial Sheet Metal	1	30 hrs
Weld 510 TIG Welding	1	30 hrs
Total semester credits	6	

Fifth semester

SM 592 HVAC Systems	1	40 hrs
SM 503 Service 1	1	30 hrs
Total semester credits	2	

Sixth semester

SM 518 Measuring and Sketching	1	30 hrs
Total semester credits	1	

Seventh semester

SM 576 Measure and Fab (Fab Tech 6)	1	30 hrs
Total semester credits	1	

Eighth semester

SM 578 Plasma Cutting Class (Fab Tech 8)	1	30 hrs
Total semester credits	1	

Ninth semester

SM401-576 TAB 1	1	30 hrs
Total semester credits	1	

Tenth semester

SM 590 Capstone Course	1	30 hrs
455-455 Transition to Trainer	1	7 hrs
Total semester credits	2	

Sheet Metal required courses

SM 521 Duct Layout 1 1

A course for the individual who wishes to acquire skill in the development of patterns for rectangular duct fittings such as are encountered in air conditioning systems. Patterns are developed for such fittings as elbows, angles, Y-branches, tees, etc., utilizing the various seams employed in the fabrication of these fittings

SM 522 Duct Layout 2 1

Designed to further the basic skills of the student in developing patterns for rectangular duct fittings. Patterns are developed for various types of offsets and transitions, utilizing the various seams used in the fabrication of these fittings.

SM 571 Fabrication Techniques 1 1

The student applies layout skills in the fabrication of shop projects. Experience is gained through the use of hand tools and machines. The projects are based on the parallel line development method. Fittings such as a tee joint and a chimney extension are fabricated.

SM 580 Sheet Metal Math 1 1

A course dealing with arithmetical calculations that must commonly be made by sheet metal workers. It includes common and decimal fractions, linear and angular measures, area and volume measures, and formulas. Facility is developed in the use of such common measuring tools as the steel rule, the protractor, and the dividers.

SM 510 Safety/Orientation 1

This course is designed to educate people who are entering the sheet metal trade to the dangers involved in working in the trade. It provides safety education in shop and field work, hand and power tools, shop equipment, electrical and welding safety, fire hazards, confined space entry and Hazard Communication

Weld 520 Welding Techniques 1

This course is primarily for beginner welders. It consists of practical uses of stick and wire-welding equipment. Students are given demonstrations of how to use equipment in various positions and typical weld joints. It provides students with the capability to perform simple welding procedures in the shop and the field. The student is introduced to oxyacetylene welding and cutting processes.

SM 582 Sheet Metal Math 2 1

A course dealing with mathematical calculations that must commonly be made by sheet metal workers. It includes formulas, equations, proportions, and trigonometry.

SM 500 Parallel Line Development 1

This course enables the student to gain a thorough knowledge of the principles of parallel line development as applied to cylindrical objects. Skill in pattern developments is acquired by laying out patterns for a variety of fittings.

SM 572 Fabrication Techniques 2 1

Patterns are developed through a combination of parallel line and radial line layout methods. Further skills in the use of hand tools and machines are attained in the fabrication and assembly of such projects as ventilators and riveted elbows.

SM 573 Fabrication Techniques 3 1

Designed to enable the student to acquire experience in developing patterns for air conditioning fittings. Skills are gained in the use of hand tools and machines through the fabrication and assembly of various fittings, such as a change elbow and a tee and pitch.

SM 501 Radial Line Development (intersections) 1

A comprehensive knowledge of the principles of radial line development may be obtained through this course. Patterns for various conical objects are developed in which these principles are applied.

SM 577 Architectural Sheet Metal 1.25

A review of shop layout and shop practices is offered. Further skill is gained through the fabrication and assembly of various architectural sheet metal problems, such as chimney flashing and gutter miters.

Weld 527 Wire Welding 1

Manipulative welding skills are developed, using a semi-automatic arc welding gun feeding coiled hard steel wire, and using carbon dioxide as gaseous shield. A general coverage of basic service and maintenance problems relating to the equipment is presented along with technical concepts as they pertain to the welding process.

Sheet Metal required courses

SM 502 Triangulation 1

This course develops a basic understanding of the principles of triangulation, the method used to lay out patterns for irregular objects. Skill in pattern development is acquired through the development of patterns for a variety of fittings and objects.

SM 556 Duct Construction 1

A course designed to meet the needs of those interested in the design and fabrication of duct work for industrial plants and residences. A study is made of duct fittings, dampers and regulators, diffusers, heaters and air washer casings and housings, fans, insulation, automatic controls and ventilating hoods.

SM 574 Fabrication Techniques 4 1

Triangulation is the basic layout method used in developing patterns for this course. Further skills are attained in the use of hand tools and machines through the fabrication and assembly of such fittings as square-to-round transitions, Y-branches, and gore elbows.

SM 594 Blueprint Reading 1

Students are trained to visualize, interpret and scale elevations, plan views, sections and details from the civil, architectural and structural portions of a set of blueprints and translate them into practical situations. Students also locate and interpret additional information concerning building construction from the specifications.

SM 410 Residential SM 1 1.25

Residential Sheet Metal 1 is the first of a 6 course program intended to provide students with the fabrication and installation skills needed for residential sheet metal work. In this first course, the student will receive an overview of the subject, be given instruction in the safety, tools and materials required in the trade, receive training in blueprint reading and drafting, and be given experience in the hand on fabrication of sheet metal items.

SM 515 Advanced Layout 1 (Join Processes) 1

A course designed for the student who has completed all of the fundamental sheet metal drawing courses and who wishes to take advanced work for the purpose of developing shortcuts. Layouts are made in such a way that skill in the saving of time, effort and materials is acquired.

SM 508 Shop Drawing & Sketching 1

Using a HVAC equipment room drawing, students draw elevation views for six different fan systems. Fan types, installation requirements and techniques and duct construction standards are studied.

SM 579 Heavy Metal Fab Techs 9 1

Designed to enable the student to gain experience in layout and fabrication of heavy-gage sheet metal. Metal thickness and bend allowances figure in pattern development. Skills are developed in the use of power equipment in cutting, bending, rolling, shaping and welding heavy gage metal.

SM 575 Fabrication Techniques 5 1

Instruction includes units on fittings encountered in air conditioning work. Training is given in the layout of patterns for the various fittings. Further experience is gained in the use of hand tools and machines through the fabrication and assembly of fittings, including tapering transitions, belt guards and louvers.

SM 562 Industrial Sheet Metal 1

The student receives instruction in the principles and operation of blowpipe systems. Air-moving devices, cyclones, baghouses, bunker dumps and types of fittings are discussed. Instruction is given in design and fabrication of blowpipe work.

Weld 510 TIG Welding 1

Instruction is given in inert-gas shielded arc welding with manually operated torch on such metals as aluminum, mild steel, and stainless steel.

SM 592 HVAC Systems 1

Fundamentals of electricity, electrical circuits and ladder diagrams. Introduction to air movement and measuring devices. Basic understanding of air conditioning systems. Basic understanding of heating systems. To be able to identify the basic components of an air conditioning and heating system. Basic understanding of the equipment used to measure electricity, air movement, in the air conditioning systems and heating systems.

SM 503 Service 1 1

A course designed to present an introduction to service work as it relates to the sheet metal trade. The student will be given an overview of Electrical Theory and Circuiting, Gas Heating Controls and Start-up, Mechanical Cooling and Economizers and Control Systems, including VAV Systems, Air Handlers and Make-up Air Systems.

SM 518 Measuring and Sketching 1

In this course, the student will be given a single line drawing and some design parameters. The student will design, size and measure the system. A sketch and shop drawing will be made from this. A takeoff will be made from this and analyzed using basic computer software.

SM 576 Measure and Fab (Fab Tech 6) 1

A course designed to accurately measure between two given points and determine the fittings and duct required to join both points. Sketch (not freehand) and detail duct run. Fill out Fab. form tickets as if material were being ordered from the shop for the field install (without missing info). To layout, form, and assemble various square, rectangular and cylindrical fittings that utilize Triangulation, radial Line and Parallel Line development principles. To install material fabricated between the points from which it was measured. To obtain practice in trigonometry using Sine, Cosine, Tangent and the rules of various types of triangles (rt., 45 degree, 30/60/90, etc.).

SM 578 Plasma Cutting (Fab Tech 8) 1

The student will be able to identify the major components of a plasma cutting system, explain important acronyms: CNC, DNC, NC, CAD, IBM, and DOS, give a short definition of plasma arc and know the meaning of dross, kerf, multitasking and fiber optics. The student will also know the danger of the high intensity arc and the potentially harmful fumes produced in the cutting process.

SM401-576 TAB 1 1

The purpose of this course is to introduce the art and science of testing, adjusting and balancing environmental systems. Students will learn how and why to take field measurements of air conditioning systems to assist in performing testing, adjusting and balancing. Emphasis will be on definitions, the interrelation of components in the total systems, the use of instruments, recording of data and following basic procedures.

SM 590 Capstone Course 1

To apply the principles and skills acquired in the preceding classes of the apprenticeship training, and apply them to complete a small duct job. To properly analyze, draw, layout, and fabricate the components of the required duct run.

455-455 Transition to Trainer 1

This required seven hour course provides guidance for soon-to-be journey level workers to be effective job site trainers allowing them to pass on their knowledge and skills to future apprentices.