

Welding I YAG

§127.821 | Two Credits | Double-Blocked | Full Year | 36 Weeks | Grades 10–12

Course Information: Welding I develops the knowledge, skills, and technologies required for employment in metal technology systems. This sequence intentionally centers Semester 1 on Shielded Metal Arc Welding (SMAW) and Semester 2 on Gas Metal Arc Welding (GMAW), while integrating welding math, drawings/symbols, inspection/codes, cutting processes, fabrication, employability, safety, and the required exposure to FCAW and GTAW. Recommended prerequisites: Algebra I, Principles of Manufacturing, Introduction to Precision Metal Manufacturing, or Introduction to Welding. §127.15(d)(1) CTE Employability Skills and the applicable §127.17 Occupational Safety and Health standards are integrated throughout.

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated TEKS	Extension Activities
1	1–2	Unit 1 - Welding I Launch: Safety, Employability & Shop Readiness	- Establish shop/worksite rules, PPE, professional conduct and safe equipment practices - Apply occupational safety/health expectations, hazard recognition and incident-prevention practices - Evaluate hazardous-material disposal and recycling procedures - Explore Welding I career expectations, postsecondary pathways and personal career goals - Practice workplace communication, scheduling and quality expectations	- WI1(A–I) - WI2(A–F) - WI4(A–E) §127.15(d)(1) §127.17	- ACCESS: welding career/postsecondary planning - Safety/PPE practical - Shop-readiness assessment
1	3–4	Unit 2 - Welding Math, Measurement, Drawings, Symbols & Joint Design	- Apply fractions, decimals, standard/metric conversions and geometric measurement - Compute area, surface area, volume, perimeter and angle-related applications - Read measuring devices and select appropriate measuring tools - Interpret orthographic/isometric views, engineering drawings, charts and diagrams - Analyze welding symbols, joints, positions and weld types	- WI3(A–L) - WI5(A–G)	- Measurement/layout lab - Welding-symbol practice - Blueprint interpretation
1	5–6	Unit 3 - Cutting Processes & Material Preparation	- Apply safe oxy-fuel and plasma cutting procedures - Set up oxy-fuel equipment and safely handle compressed gases - Perform piercing, straight-line and bevel cuts and identify acceptable cut quality - Set up plasma arc cutting and perform straight, piercing, bevel and shape cuts - Prepare plate/joints for Semester 1 SMAW production	- WI7(A–H) - WI8(A–G) - WI4(A–E)	- Oxy-fuel cutting practical - Plasma cutting practical - Cut-quality evaluation
1	7–9	Unit 4 - SMAW Foundations: Equipment, Current & Electrodes	- Apply SMAW safety and proper machine setup - Analyze AC/DC current, heat transfer and polarity relationships - Apply SMAW principles and troubleshoot basic setup/arc issues - Explain AWS electrode identification and select electrodes for base metal/application - Practice arc starts, beads, joint preparation and introductory fillet/groove welds	- WI9(A–G) - WI3(D–L) - WI5(E–G) - WI6(A–B)	- Electrode identification - SMAW setup practical - Bead/fillet skills progression
2	10–12	Unit 5 - SMAW Fillet Welds & Welding Positions	- Develop SMAW fillet weld proficiency using appropriate electrodes - Practice flat, horizontal, vertical and overhead positions - Use welding symbols/drawings to prepare and fit joints - Inspect weld profile and identify discontinuities using visual inspection - Record settings, measurements and quality findings in technical work documentation	- WI9(A–G) - WI3(A,C–L) - WI5(A–G) - WI6(A–B)	- Fillet-weld performance tasks - Visual inspection rubric - Skills log
2	13–15	Unit 6 - SMAW Multi-Pass Groove Welds & Code Awareness	- Prepare joints and perform multi-pass groove welds - Progress through required welding positions toward industry-accepted standards - Explain weld inspection processes and interpret introductory welding-code requirements - Connect AWS/API code awareness to workmanship and acceptance criteria - Use measurement, math and troubleshooting to improve weld quality	- WI6(A–B) - WI9(A–G) - WI3(B–L) - WI5(A–G)	- Multi-pass groove practical - AWS/API code analysis - Weld inspection
2	16–17	Unit 7 - Semester 1 SMAW Fabrication Project	- Plan and fabricate an approved SMAW-centered project - Apply drawings, symbols, layout, measurement, cutting, fit-up and joint preparation - Work independently and collaboratively while following shop safety and schedules - Inspect work process/end product and correct quality issues - Document materials, estimated costs, work order/process and final evaluation	- WI1(A–I) - WI3(A–L) - WI4(A–E) - WI5(A–G) - WI6(A–B) - WI7–9 applied	- SMAW fabrication project - Portfolio evidence - Peer/teacher QC
2	18	Semester 1 Exam - SMAW Emphasis	- Cumulative written assessment of Semester 1 TEKS - SMAW setup, electrode selection, safety and welding performance assessment - Drawing/symbol, measurement, cutting and inspection application	- Cumulative WI1–9 as introduced §127.15(d)(1) §127.17	Targeted review/remediation
3	19–20	Unit 8 - GMAW Foundations: Safety, Equipment, Filler Metal & Variables	- Apply GMAW safety and proper equipment setup - Explain GMAW principles and AWS filler-metal identification - Select filler metal appropriate to base metal - Analyze effects of weld angle, work angle and electrode extension - Establish baseline machine settings and document process variables	- WI10(A–G) - WI3(D–L) - WI4(A,E)	- GMAW setup practical - Filler-metal identification - Variables/settings lab
3	21–23	Unit 9 - GMAW Fillet Welds & Position Development	- Perform GMAW fillet welds with increasing consistency - Develop technique across flat, horizontal, vertical and overhead positions - Apply drawings, symbols, fit-up and measurement to weld preparation - Inspect welds and troubleshoot causes of discontinuities - Adjust settings/technique using documented evidence and feedback	- WI10(A–G) - WI3(A,C–L) - WI5(A–G) - WI6(A–B)	- Fillet-weld skills progression - Settings log - Visual QC

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated TEKS	Extension Activities
3	24–27	Unit 10 - GMAW Groove Welds, Fabrication & Quality	• Perform GMAW groove welds in required positions • Apply filler-metal selection, equipment setup and welding variables to production • Use welding codes/inspection concepts to evaluate workmanship • Complete an approved GMAW-centered fabrication work product • Document costs, measurements, work order, process decisions and final quality	• WI1(E-I) • WI3(B-L) • WI5(A-G) • WI6(A-B) • WI10(A-G)	• GMAW fabrication project • Code/QC review • Portfolio update
4	28–29	Unit 11 - FCAW Principles & Application	• Apply FCAW safe operating practices • Explain effects of weld/work angle and electrode extension • Apply FCAW principles and proper setup • Explain AWS FCAW electrode identification and select appropriate filler metal • Perform introductory fillet/groove welds in multiple positions	• WI11(A-G) • WI4(A,E) • WI5(E-G)	• FCAW setup/identification • FCAW weld practical • GMAW/FCAW comparison
4	30–31	Unit 12 - GTAW Principles & Application	• Apply GTAW safe operating practices • Analyze AC/DC current, heat transfer and polarity relationships • Identify common tungsten and filler metals using AWS identification • Demonstrate proper GTAW setup • Perform introductory fillet/groove welds and explore carbon steel, stainless steel and aluminum applications	• WI12(A-F) • WI4(A,E) • WI5(E-G)	• GTAW setup practical • Tungsten/filler identification • Material/process comparison
4	32–33	Unit 13 - Integrated Fabrication, Inspection & Process Selection	• Select appropriate SMAW, GMAW, FCAW or GTAW process for an approved task • Interpret drawings/symbols and complete layout, fit-up and fabrication • Apply inspection/code concepts to evaluate weldments • Compare process advantages, limitations, quality and productivity • Troubleshoot and revise work based on inspection results	• WI3(A-L) • WI5(A-G) • WI6(A-B) • WI9–12 applied	• Multi-process fabrication • Process-selection justification • Inspection report
4	34–35	Unit 14 - Welding I Capstone, Career Transition & Portfolio	• Complete a capstone emphasizing demonstrated SMAW and GMAW competencies • Integrate safe work practices, measurement, drawings, fabrication and quality control • Evaluate progress toward career goals and identify next-step training/credentials • Practice interviewing and professional workplace communication • Finalize résumé/skills portfolio and prepare work for showcase	• WI1(A-I) • WI2(A-F) • WI3–12 applied • §127.15(d)(1) • §127.17	• ACCESS: résumé/training/credential planning • Mock interview • Capstone portfolio
4	36	Semester 2 Exam & Welding I Showcase	• Cumulative written assessment across all Welding I TEKS • GMAW-centered performance/application assessment with safety and quality criteria • Final portfolio, fabrication evidence and reflection	• Cumulative WI1–12 • §127.15(d)(1) • §127.17	• Targeted remediation • Student showcase

Welding I TEKS Coverage Checklist

Coverage verification: All 12 Welding I knowledge and skills strands and all 83 student expectations in §127.821 are intentionally addressed, with §127.15(d)(1) CTE Employability Skills and applicable §127.17 Occupational Safety and Health standards integrated throughout.

Strand	SEs	Knowledge & Skills Focus	YAG Placement	Coverage
WI1	A-I	Professional communication, ethics, quality, systems/problem solving, policies/safety, time management	Units 1, 7, 10, 14	100%
WI2	A-F	Postsecondary readiness, employer expectations, professional standards, career goals, communication, safety	Units 1, 14	100%
WI3	A-L	Communication, cost math, work orders, measurement, geometry, conversions and circle applications	Units 2, 4-10, 13-14	100%
WI4	A-E	Equipment safety, hazardous materials, recycling, PPE and workplace safety	Units 1, 3-4, 8, 11-12, 14	100%
WI5	A-G	Engineering drawings/views, welding symbols, joints, positions and weld types	Units 2, 4-7, 9-10, 13-14	100%
WI6	A-B	Weld inspection processes and welding codes	Units 4-7, 9-10, 13-14	100%
WI7	A-H	Oxy-fuel cutting safety, setup, gases, cutting factors/techniques, cut quality and alternate fuels	Units 3, 7	100%
WI8	A-G	Plasma arc cutting safety, theory, compressed air, setup, terminology and cutting techniques	Units 3, 7	100%
WI9	A-G	SMAW safety, current/polarity, principles/setup, AWS electrodes, selection, multi-pass groove welds/all positions	Units 4-7; Semester 1 emphasis	100%
WI10	A-G	GMAW safety, angles/extension, principles/setup, AWS filler metal, selection, fillet/groove welds/all positions	Units 8-10, 13-14; Semester 2 emphasis	100%
WI11	A-G	FCAW safety, angles/extension, principles/setup, AWS electrodes, filler selection, fillet/groove welds	Units 11, 13-14	100%
WI12	A-F	GTAW safety, current/polarity, tungsten/filler identification, setup, welds/positions and multiple metals	Units 12-14	100%
§127.15(d)(1)	Integrated	Required CTE employability skills	All units	100%
§127.17	Integrated	Applicable occupational safety and health standards required for Welding I	All laboratory units	100%

Implementation Notes

- Semester 1 is intentionally SMAW-centered. Foundational safety, math, measurement, drawings/symbols, cutting, inspection and code awareness are taught as supporting competencies for SMAW production and fabrication.
- Semester 2 is intentionally GMAW-centered. Students progress from GMAW setup and process variables to fillet/groove welds, position development, fabrication and quality evaluation.
- FCAW and GTAW remain required Welding I TEKS. They are taught in Grading Period 4 as focused process units and then reinforced in integrated fabrication/process-selection work so all Welding I standards are addressed without displacing the district's SMAW/GMAW emphasis.
- Safety is continuous. Applicable §127.17 occupational safety and health standards should be embedded in demonstrations, laboratory procedures, hazard recognition, PPE, equipment operation, material handling, incident prevention and student performance expectations.
- ACCESS should support welding career exploration, postsecondary/technical training, credentials, résumé/interview preparation and transition into Welding II, practicum, apprenticeship or employment.
- Weeks 18 and 36 are reserved for cumulative semester exams. No instructional unit crosses the semester boundary.