

Advanced Welding YAG

\$127.822 | Two Credits | Full Year | 36 Weeks | Grades 11–12 | Prerequisite: Welding I

Course Information: Welding II builds on Welding I through advanced welding concepts, fabrication, inspection, cutting, and process application. This sequence is intentionally organized around Gas Tungsten Arc Welding (GTAW) during Semester 1 and multi-process welding plus advanced/plasma cutting during Semester 2. Semester 2 integrates GTAW with SMAW and FCAW, along with process selection, fabrication, inspection, troubleshooting, engineering drawings, cost estimation, and career readiness. §127.15(d)(2) CTE Employability Skills are integrated throughout. ACCESS supports advanced welding careers, postsecondary training, credentials, apprenticeship, and employment planning.

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated TEKS	Extension Activities
1	1–2	Unit 1 - Advanced Shop Safety, Employability & Welding II Readiness	- Reestablish advanced shop safety, PPE and regulatory expectations - Evaluate employer expectations, professional standards and customer satisfaction - Set advanced career goals and identify postsecondary/training requirements - Review hazardous-material disposal, recycling and emerging welding technologies - Assess Welding I skills needed for successful advanced work	- WII1(A–F) - WII3(A–F) §127.15(d)(2)	- ACCESS: advanced welding pathways - Safety qualification - Career goal plan
1	3–4	Unit 2 - Advanced Welding Math, Cost Estimation, Drawings & Inspection	- Estimate material/project costs and explain how measurement accuracy affects cost - Select measuring tools and compute area, surface area, volume and perimeter - Apply fractions/decimals, formulas and Pythagorean relationships to fabrication - Use engineering drawings to plan advanced work - Introduce weld inspection, applicable codes and peer-quality evaluation	- WII2(A–G) - WII4(A–B) - WII6(A–C)	- Cost-estimation task - Advanced drawing interpretation - Inspection/code exercise
1	5–6	Unit 3 - GTAW Foundations: Safety, Equipment, Current & Setup	- Apply GTAW-specific safe operating practices - Review AC/DC current, heat transfer and polarity as they affect GTAW - Identify GTAW power-source, torch, shielding-gas and accessory components - Select tungsten/filler materials for assigned applications - Demonstrate proper GTAW setup and troubleshooting procedures	- WII3(A,E) - WII5(C) - WII10(A–C)	- GTAW setup practical - Tungsten/filler selection - Equipment troubleshooting
1	7–9	Unit 4 - GTAW Carbon Steel: Fillet & Groove Weld Development	- Prepare joints and establish GTAW technique on carbon steel - Perform fillet and groove welds with emphasis on puddle control and filler addition - Develop consistency through flat and horizontal work before progressing positions - Inspect peer weldments and critique quality using established criteria - Document settings, measurements and corrective actions	- WII5(A–C) - WII6(A–C) - WII10(A–C)	- GTAW carbon-steel practical - Peer weld inspection - Skills log
2	10–12	Unit 5 - GTAW Stainless Steel	- Compare carbon-steel and stainless-steel GTAW requirements - Select tungsten/filler and settings appropriate to stainless applications - Control heat input, distortion and contamination - Perform fillet/groove welds and progress appropriate positions - Inspect weld appearance and quality against industry expectations	- WII3(A,E) - WII6(A–C) - WII10(A–C)	- Stainless GTAW practical - Heat-control analysis - Quality evaluation
2	13–15	Unit 6 - GTAW Aluminum	- Analyze AC/current relationships and cleaning requirements for aluminum GTAW - Select appropriate tungsten/filler materials - Set up GTAW equipment for aluminum applications - Perform fillet/groove welds and develop position skills - Compare aluminum, stainless and carbon-steel GTAW procedures and results	- WII3(A,E) - WII6(A–C) - WII10(A–C)	- Aluminum GTAW practical - Material comparison - Setup/troubleshooting task
2	16–17	Unit 7 - GTAW Advanced Application & Semester Fabrication	- Complete an advanced GTAW-centered fabrication project independently/collaboratively - Use engineering drawings, measurements and cost estimates - Apply GTAW to appropriate metals and positions - Inspect/critique team weldments and troubleshoot equipment/process problems - Document project planning, production, quality and career-skill evidence	- WII2(A–G) - WII4(A–B) - WII5(A–C) - WII6(A–C) - WII10(A–C)	- GTAW fabrication project - Portfolio evidence - Industry-style QC
2	18	Semester 1 Exam - GTAW Emphasis	- Cumulative written/performance assessment covering safety, math/costs, drawings, inspection and GTAW - GTAW setup, process, material selection and welding performance - Semester portfolio/project review	- Cumulative WII1–6 & WII10 §127.15(d)(2)	Targeted review/remediation
3	19–20	Unit 8 - Advanced Cutting & Plasma Arc Cutting	- Apply safe practices for advanced cutting and compressed-gas systems - Set up and operate plasma arc cutting equipment - Perform straight, piercing, bevel and shape-cutting applications as equipment allows - Compare plasma cutting with oxy-fuel cutting for material, speed, quality and application - Evaluate cuts against accepted welding/fabrication standards	- WII7(A–C) - WII3(A,E) - WII5(C)	- Plasma cutting practical - OFC/PAC comparison - Cut-quality inspection
3	21–23	Unit 9 - SMAW Advanced / Multi-Pass Welding	- Refresh safe SMAW setup and electrode selection - Perform advanced/multi-pass welds in required positions - Apply drawings and specifications to joint preparation and welding - Inspect completed weldments and identify corrective actions - Compare SMAW productivity/quality with other available processes	- WII5(A–C) - WII6(A–C) - WII8(A–B)	- Advanced SMAW practical - Multi-pass weld task - Inspection report
3	24–27	Unit 10 - FCAW Advanced Welding	- Apply FCAW safe operating practices - Set up FCAW equipment and select appropriate filler metal - Perform fillet and groove welds - Develop welds in appropriate positions to industry-accepted standards - Troubleshoot equipment/process variables and evaluate weld quality	- WII3(A,E) - WII5(A–C) - WII6(A–C) - WII9(A–C)	- FCAW setup/performance - Position weld progression - Troubleshooting lab

GP	Wks	Unit & Focus	Major Learning Tasks & Assessments	Integrated TEKS	Extension Activities
4	28-30	Unit 11 - Multi-Process Welding: GTAW, SMAW & FCAW	• Select the most appropriate process for assigned materials/joints/applications • Complete multi-process work using GTAW, SMAW and FCAW • Compare process productivity, quality, equipment and material considerations • Apply engineering drawings and cost estimates to fabrication decisions • Inspect and critique multi-process weldments using selected codes/criteria	• WII2(A-G) • WII4(A-B) • WII5(A-C) • WII6(A-C) • WII8-10	• Process-selection challenge • Multi-process weldment • Cost/quality comparison
4	31-33	Unit 12 - Advanced Fabrication, Plasma Cutting & Production Project	• Plan and fabricate a real-world application item independently and collaboratively • Use plasma/advanced cutting for project preparation where appropriate • Integrate multiple welding processes based on project requirements • Troubleshoot equipment and production problems • Inspect team work, apply code criteria and revise work to improve quality	• WII3(A-F) • WII4(A-B) • WII5(A-C) • WII6(A-C) • WII7(A-C) • WII8-10	• Advanced fabrication project • Plasma-cut components • Peer/code inspection
4	34-35	Unit 13 - Career Transition, Emerging Technology & Advanced Welding Capstone	• Evaluate emerging welding technologies, automation/CNC/robotic welding applications • Finalize career goals and research postsecondary, apprenticeship and credential options • Practice professional communication/interview skills • Complete final advanced welding capstone evidence and quality documentation • Present welding portfolio demonstrating GTAW and multi-process growth	• WII1(A-F) • WII3(D,F) • WII4(A-B) • WII5(A-C) • WII6(A-C) • §127.15(d)(2)	• ACCESS: apprenticeship/credential planning • Mock interview • Portfolio/capstone presentation
4	36	Semester 2 Exam & Advanced Welding Showcase	• Cumulative written/performance assessment across all Welding II TEKS • Multi-process/plasma application and inspection component • Final portfolio and fabrication showcase	• Cumulative WII1-10 • §127.15(d)(2)	• Targeted remediation • Advanced welding showcase

Welding II TEKS Coverage Checklist

Coverage verification: All 10 Welding II knowledge and skills strands and all 38 student expectations in §127.822(d), plus §127.15(d)(2) CTE Employability Skills, are intentionally addressed in the 36-week sequence.

Strand	SEs	Knowledge & Skills Focus	YAG Placement	Coverage
WII1	A–F	Postsecondary readiness, employer expectations, professional standards, career goals, communication, workplace safety	Units 1, 13	100%
WII2	A–G	Cost estimation, measuring accuracy/tool selection, geometry, fractions/decimals, Pythagorean theorem, formulas	Units 2, 7, 11	100%
WII3	A–F	Equipment safety, hazardous-material disposal, recycling, emerging technology, PPE, automated welding/CNC/robotics	Units 1, 3, 5–6, 8, 10, 12–13	100%
WII4	A–B	Engineering drawings for advanced projects and project evaluation	Units 2, 7, 11–13	100%
WII5	A–C	Independent fabrication, collaborative real-world applications, equipment troubleshooting	Units 3–13	100%
WII6	A–C	Peer weld inspection, code selection, critique/evaluation of weldments	Units 2, 4–13	100%
WII7	A–C	Advanced cutting: safe practices, compressed gases, cutting to accepted standards; plasma emphasized locally	Units 8, 12	100%
WII8	A–B	Advanced SMAW: safe operation and welds in all positions to industry standards	Units 9, 11–12	100%
WII9	A–C	FCAW: safe operation, fillet/groove welds, appropriate positions to industry standards	Units 10–12	100%
WII10	A–C	GTAW: safe operation, fillet/groove welds in all positions, carbon steel/stainless/pipe/aluminum	Units 3–7, 11–13; Semester 1 emphasis	100%
§127.15(d)(2)	Integrated	Required Level 3/4 CTE employability skills	All units	100%

Implementation Notes

- Semester 1 is intentionally centered on GTAW. Students progress from safety, equipment, current/polarity and filler/tungsten selection into carbon steel, stainless steel, aluminum, multiple positions and an advanced GTAW fabrication project.
- Semester 2 is intentionally centered on multi-process welding and advanced cutting. Plasma arc cutting is emphasized as the local advanced-cutting application while students integrate GTAW, SMAW and FCAW in fabrication and process-selection work.
- The current Welding II TEKS require advanced cutting, SMAW, FCAW and GTAW. GMAW is not a separate Welding II strand; prior GMAW knowledge from Welding I may be reinforced in multi-process work when appropriate, but the YAG prioritizes the processes explicitly required by §127.822.
- Inspection, welding codes, engineering drawings, cost estimation, troubleshooting, independent work and collaboration should be embedded into authentic fabrication rather than treated only as isolated classroom topics.
- ACCESS should support advanced welding careers, postsecondary technical programs, apprenticeships, credentials, résumé/interview preparation and transition to practicum or employment.
- Weeks 18 and 36 are reserved for cumulative semester exams. No instructional unit crosses the semester boundary.