

WELDING (WEL)

WEL-137 Industrial Welding Robotics (2)

Explore multiple types of industry-related robotic welding, focusing on essential tasks and procedures for operators, technicians, engineers, and programmers to set up and program Fanuc Robotics and Miller Copilot systems. Gain hands-on experience with various welding processes to produce quality welds using each robotic system. Develop skills for success in the evolving field of robotic welding technology. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

WEL-208 Introduction to Fabrication (2)

Introduces hands-on fabrication basics used by welding industries. Covers layout, reading blueprints, applied math, cost estimation, jigs and fixtures, and introduction to shearing, bending, drilling, sawing and other manufacturing process associated with welding fabrication. Arts & Sciences Elective Code: B

Hours per week: 4.0 lab

Prerequisite: Take WEL-267.

WEL-228 Introduction to Welding, Safety & Health of Welders: SENSE1 (1)

Provides an orientation to the welding profession, including basic safety and health within the welding profession. Aligns to SENSE Level 1, Module 1 and Module 2 - Key Indicators 1-6. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture

WEL-233 Print Reading and Welding Symbol Interpretation: SENSE1 (3)

Interpret welding prints, including drawings and sketches, with a focus on accurate measurement, understanding AWS welding symbols, and meeting fabrication requirements. Gain practical experience in preparing, assembling, and tacking welding parts according to welding prints, using appropriate materials and tools to execute projects effectively and meet industry standards. Arts & Sciences Elective Code: B

Hours per week: 3.0 lecture

Prerequisite: Take MAT-765.

WEL-244 Gas Metal Arc Welding Short Circuit Transfer: SENSE1 (2)

Focuses on proper weld safety, machine setup and welding techniques of Gas Metal Arc Welding Short-Circuiting Transfer. Students perform American Welding Society compliant welds on carbon steel, in flat, horizontal, vertical and overhead positions. Prepares students to take an AWS welder certification test, which is recommended for its successful completion. Aligns with SENSE Level 1 Module 5 - Key Indicators 1-7, as well as Module 2 - Indicator 7, Module 3- Key Indicator 3, and Module 9 - Key Indicator 2. Arts & Sciences Elective Code: B

Hours per week: 4.0 lab

Corequisite: Take WEL-228.

WEL-245 Gas Metal Arc Welding Spray Transfer: SENSE1 (2)

Focuses on proper weld safety, machine setup and welding techniques of Gas Metal Arc Welding Spray Transfer. Students perform American Welding Society compliant welds on carbon steel in flat and horizontal positions. Prepares students to take an AWS welder certification test, which is recommended for its successful completion. Aligns with SENSE Level 1 Module 5 Key Indicators 1, 2 and 8-12, as well as Module 2 - Indicator 7, Module 3- Key Indicator 3, and Module 9 - Key Indicator 2.

Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

Corequisite: Take WEL-228.

WEL-251 Gas Tungsten Arc Welding for Carbon Steel: SENSE1 (2)

Focuses on proper weld safety, machine setup and welding techniques for Gas Tungsten Arc Welding. Prepares students to perform American Welding Society compliant welds on carbon steel in flat, horizontal, vertical and overhead positions. Qualifies students to take an AWS welder certification test, which is recommended for successful completion of this course. Aligns to SENSE Level 1, Module 7 - Key Indicators 1-7, as well as Module 2 - Key Indicator 7, Module 3- Key Indicator 3, and Module 9 - Key Indicator 2. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

Corequisite: Take WEL-228.

WEL-254 Welding Inspection and Testing Principles: SENSE1 (1)

Gain a foundational understanding of welding inspection, covering the role of a welding inspector, the impact of welding processes, joint configurations, and symbols on weld quality. Study basic metallurgical principles, industry codes, standards, and specifications related to welding procedures and qualifications. Learn to apply non-destructive testing methods to assess weld quality in compliance with established standards. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture

Pre/corequisite: Take WEL-233.

WEL-267 Welding for Maintenance Trades (3)

Focuses on safety, setup and layout of measurements and weldments. Requires demonstration of proper techniques for repair/maintenance welds. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

WEL-268 Flux Cored Arc Welding Self-Shielded/Gas-Shielded (3)

Focus on proper weld safety, machine setup, and welding techniques for flux-cored arc welding in both self-shielded and gas-shielded applications. Perform AWS-compliant welds on carbon steel in various positions, with preparation for the AWS welder qualification test recommended. Aligns with SENSE Level 1 standards to ensure foundational competency. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Prerequisite: Take WEL-228. Take WEL-279.

WEL-269 Thermal Cutting Processes (3)

Focuses on proper safety, equipment setup, and cutting techniques for oxy-fuel, plasma, and carbon steel arc cutting on carbon steel, austenitic stainless steel, and aluminum. Students perform American Welding Society compliant cutting operations in the flat position as well as scarfing and gouging operations to remove base and weld metal in flat and horizontal positions. Aligns to SENSE Level 1 Module 8 Units 3 and 4; Module 2 Key Indicator 7; Module 9 Key Indicator 1. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Corequisite: Take WEL-228.

WEL-271 Documents Governing Welding and Weld Inspection (3)

Develop essential skills in welding procedure development and inspection by analyzing AWS codes to create Welding Procedure Specifications (WPS) and Welding Procedure Qualification Records (WPQR). Learn to evaluate Mechanical Bend Tests and conduct visual inspections for discontinuities and defects according to AWS standards. Gain proficiency in using codebook information for comprehensive quality assessments, preparing for roles in welding quality assurance. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

WEL-272 Advanced Gas Tungsten Arc Welding - Pipe (6)

Focuses on safety, amperage settings, polarity, and the proper selection of electrodes for the gas tungsten arc welding process. Students perform American Welding Society compliant welds on carbon steel pipe and stainless steel pipe. Students utilize visual and destructive methods for determining weld quality from prior SENSE I curriculum. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 10.0 lab

WEL-273 Gas Tungsten Arc Welding Stainless Steel And Aluminum (3)

Introduces various technical programs being integrated into or associated with the welding profession. Focuses on proper weld safety, machine setup, and welding techniques for gas tungsten arc welding. Students perform American Welding Society compliant welds on stainless steel and aluminum in flat, horizontal, vertical, and overhead positions. Aligns to SENSE Level 1 Module 7 Key Indicators 1-7; Module 2 Key Indicator 7; Module 3 Key Indicator 3; Module 9 Key Indicator 2. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Prerequisite: Take WEL-228.

WEL-274 Shielded Metal Arc Welding I: SENSE1 (3)

Emphasizes safety, amperage settings, polarity, and proper electrode selection for the Shielded Metal Arc Welding (SMAW) process. Trains students to perform American Welding Society (AWS) compliant welds on carbon steel, with a focus on producing high-quality results. Includes both visual and destructive methods for assessing weld quality to provide a comprehensive understanding of industry standards and practices. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Corequisite: Take WEL-228.

WEL-275 Shielded Metal Arc Welding II: SENSE1 (3)

Focuses on safety, amperage settings, polarity and the proper selection of electrodes for the Shielded Metal Arc Welding (informally known as stick welding) process. Prepares students to perform American Welding Society complaint welds on carbon steel, in vertical up and overhead configurations, using visual and destructive methods for determining weld quality. Aligns to SENSE Level 1 Module 4: Shielded Metal Arc Welding Key Indicators 1-7 for the flat and horizontal positions, as well as Module 2 - Key Indicator 7, Module 3- Key Indicator 3, and Module 9 - Key Indicator 2. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Prerequisite: Take WEL-228. Take WEL-274.

WEL-279 GMAW Processes (3)

Learn the fundamental principles of Gas Metal Arc Welding (GMAW) using Short Circuit and Spray Transfer processes, emphasizing weld safety, machine setup, and technique. Perform AWS-compliant welds on carbon steel in multiple positions, gaining the skills to pursue AWS welding certification for industry readiness. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Pre/corequisite: Take WEL-228.

WEL-286 Advanced Shielded Metal Arc Welding Principles and Practices (6)

Prepares to utilize the SMAW process to weld all position fillet and groove welds on carbon steel plate using stainless steel electrodes. Examines production of SMAW pipe welds in the 2G, 5G and 6G positions. Aligns with SENSE 2, Units 1 through 11. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 10.0 lab

Prerequisite: Take WEL-275.

WEL-287 Layout and Fitup (3)

Build multiple welding projects using various hand tools and measuring equipment, demonstrating proficiency in fabricating and assembling projects according to specifications. Analyze project requirements to select appropriate materials and tools, and apply welding techniques that meet industry quality and safety standards. Evaluate projects through inspection and measurement to ensure alignment with design criteria. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

WEL-290 Advanced Flux Cored Arc Welding Principles and Practices (3)

Prepares students to produce FCAW-S/FCAW-G welds on carbon steel in the 2G and 5G pipe positions. Aligns with SENSE 2, Units 1 through 10. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

WEL-291 Advanced Gas Metal Arc Welding Pipe Principles and Practices (3)

Deepen knowledge of Gas Metal Arc Welding (GMAW) by exploring the impact of different transfer modes (short-circuit, globular, spray, and pulsed-spray) on weld quality. Master advanced techniques through hands-on practice and analysis to make informed decisions on setup and execution based on material and project needs. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Prerequisite: Take WEL-279.

WEL-297 Gas Tungsten Arc Welding for Carbon (3)

Focus on weld safety, machine setup, and essential techniques for Gas Tungsten Arc Welding (GTAW). Develop the skills needed to perform AWS-compliant welds on carbon steel in multiple positions, with preparation for the AWS welder certification test recommended for industry readiness. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 4.0 lab

Pre/corequisite: Take WEL-228.

WEL-317 Flux Cored Arc Welding (2)

Explore the fundamentals of Flux Cored Arc Welding (FCAW) using self-shielded and gas-shielded methods. Emphasize weld safety, machine setup, and technique development, performing AWS-compliant welds on carbon steel in various positions. Learn to locate and interpret critical information for inspecting AWS-compliant welds, preparing for industry certifications. Arts & Sciences Elective Code: B

Hours per week: 0.5 lecture, 3.0 lab

Prerequisite: Take WEL-228. Take WEL-279.

WEL-318 Welding Fabrication (2)

Gain skills in reading and interpreting blueprints through practical projects and lab exercises. Focus on welding-specific drawings to identify symbols, dimensions, tolerances, and critical blueprint elements. Develop the ability to translate blueprints into physical weldments, ensuring accuracy and quality in fabrication and assembly. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

Prerequisite: Take WEL-228.

Corequisite: Take WEL-233.

WEL-319 Material Processing (1)

Learn foundational material processing skills essential to welding and fabrication, working with mills, lathes, saws, shears, plasma cutters, oxy-acetylene torches, and carbon arc gouging tools. Emphasis is placed on safe operation, setup, and handling techniques, preparing for advanced welding and fabrication coursework. Arts & Sciences Elective Code: B

Hours per week: 2.0 lab

Pre/corequisite: Take WEL-228.

WEL-321 Welding Quality Assurance for Manufacturing (2)

Explore welding quality assurance within manufacturing, focusing on its role in product integrity and cost-effectiveness. Study the principles of quality control, fixturing design, and lean manufacturing to improve welding efficiency. Hands-on projects provide experience with robust quality assurance systems for diverse manufacturing environments. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

WEL-331 Welding Fundamentals (2)

Covers basic welding techniques with oxyacetylene and electric welders. Designed for the general tradesperson working in the areas of mechanics and automotive technology. Students are introduced to a variety of welding situations including cutting, brazing and various welding positions on lighter gauges of metal and basic fabrication. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

WEL-333 Auto Collision Welding (2)

Introduces basic welding techniques that can be applied to auto collision repair. Students learn to weld light gauge sheet metal with the GMAW process. Instruction emphasizes the requirements needed to pass the I-CAR Automotive GMA (MIG) Welding Steel Qualification Test. Students also receive instruction in the use of an oxyacetylene torch and a plasma cutter. Arts & Sciences Elective Code: B

Hours per week: 1.0 lecture, 2.0 lab

WEL-800 Welding Capstone (4)

Apply welding knowledge and skills to a comprehensive project, designed to meet industry standards and specifications. Emphasize project management, quality assessment, and professional development, building a portfolio that demonstrates capability in various welding techniques and safety protocols. Arts & Sciences Elective Code: B

Hours per week: 8.0 lab

Prerequisite: Take WEL-287.

Pre/corequisite: Take WEL-286. Take WEL-291.

WEL-924 Honors Project (1)

Allows a qualified honors student to pursue a special concentration of study under the guidance of a faculty member. Requires completion of an honors project contract. May be taken more than once. Arts & Sciences Elective Code: B; Comments: Requires approval of supervising professor and dean

Hours per week: 1.0 lecture

WEL-928 Independent Study (1-3)

Provides readings, papers and basic research or other projects under the individual guidance of a staff member. Arts & Sciences Elective Code: B; Comments: Permission of instructor, dean

Hours per week: 1.0 lecture

WEL-932 Internship (3-4)

Engage in real-world welding projects within a professional environment, applying theoretical knowledge and practical skills. Focus on hands-on experience, effective problem-solving, and skill refinement through self-assessment and feedback from supervisors. Enhance readiness for welding industry careers. Arts & Sciences Elective Code: B

Hours per week: 12.0 internship