

Electrical & Instrumentation Technologist Grade 1

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
Domain 1 – Installation and Configuration			
Sub-Domain 1.1 – Installation			
1. Assist in the installation and modification of water / wastewater communication systems			
2. Assist in the installation of conduit, wire, relays, pull boxes, switchboards, and switches in making additions, extensions, or alterations in electrical systems in accordance with the National Electric Code			
3. Understand basic cogeneration components and how cogeneration works			
4. Assist in the installation of solar and wind generation systems as applicable, batteries, battery chargers, and uninterruptable power supplies (UPS)			
5. Assist in the installation of pneumatic control valves and understand the configuration of the control scheme			
Sub-Domain 1.2 – Configuration			
1. Assist in the configuration of process and instrumentation diagrams (P&ID), control loop parameters and logic for programmable logic controllers (PLC) and control systems			
2. Assist in the configuration of variable frequency drives (VFDs), electromechanical valves, instrumentation (level sensors), and pressure/temperature/flow transmitters, and similar analyzing instruments used in water / wastewater systems			
3. Assist in the configuration of pneumatic and hydraulic control valves and sensors			
How would you rank Domain 1 based on what you selected for each Sub-Domain?			
Domain 2 – Maintenance and Repair			
Sub-Domain 2.1 – Systems			
1. Assist in the maintenance, repair, and configuration of electronic systems, variable frequency drives (VFDs), and soft starters			
2. Identify and assist in the troubleshooting, adjustment, and repair of low voltage electrical problems in water / wastewater facilities			
3. Assist in the maintenance and repair of electrical and electronic operational control, recording, and alarm systems			
4. Assist with the testing, location, and repair of damaged electrical circuitry and communication systems			
5. Understand the basics of fiber optic systems			
6. Read and interpret electrical schematics, including power distribution, motor control centers (MCCs), and programmable logic controller (PLC) control panels			

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7. Read and interpret process and instrumentation diagrams (P&ID), process flow diagrams (PFD), loop diagrams, functional diagrams, and networking diagrams including fiber optic, copper, and wireless installations			
8. Identify equipment details from manuals and manufacturer documentation			
Sub-Domain 2.2 - Equipment and Parts			
1. Under direct supervision, maintain, repair, troubleshoot, and replace electrical and electronic equipment, including communication hubs, motors, pumps, generators, controllers, switchboards, switches and electronic boards, circuitry, components, and other equipment			
2. Identify defects and assist in troubleshooting, testing, locating, calibrating, and repairing defects in instrumentation and electronic control equipment			
3. Assist in solar, battery, and uninterruptable power supplies (UPS) maintenance			
4. Demonstrate a basic understanding of conduit bending and installation			
How would you rank Domain 2 based on what you selected for each Sub-Domain?			
Domain 3 - Safety, Tools, and Equipment			
Sub-Domain 3.1 - Safety			
1. Identify and understand occupational hazards and safety precautions necessary when working with Direct Current (DC) and Alternating Current (AC) power and voltages up to 480V maximum			
2. Understand and perform confined space entries per CalOSHA regulations			
3. Inspect electrical equipment and lighting to ensure safe and satisfactory functioning			
4. Follow all OSHA guidelines, use safe work working practices, and report hazardous work conditions			
5. Understand Arc Flash and boundaries, classified areas, and perform Lockout Tagout (LOTO)			
6. Understand personal protective equipment (PPE) needs in electrical, mechanical, and chemical areas			
Sub-Domain 3.2 - Codes			
1. Basic understanding of applicable electrical codes (including the National Electrical Code pertaining to industrial and commercial, California Electrical Code, NFPA 820, 70, and 70E) for water professionals			
Sub-Domain 3.3 - SCADA			
1. Understand basic SCADA communications (radios, antennas, switches, routers), basic SCADA components (PLC, desktop, servers), and basic software used in SCADA systems (PLC programming, SCADA programming, communication and alarm servers, call out systems, etc.)			
2. Understand the role of each device in the SCADA network professionals			
Sub-Domain 3.4 - Tools and Equipment			
1. Perform tool maintenance and general clean-up of tools, equipment, and work areas			
2. Understand the difference between water and wastewater cleanliness for tools			
3. Use a variety of diagnostic and test equipment including computers, process meters, and other equipment and devices to calibrate, repair, and maintain water / wastewater systems			
4. Select and use appropriate hand tools and power tools for electrical tasks			

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5. Assist in the maintenance of electrical metering and telemetering equipment			
6. Use appropriate measuring instrument to test voltage, amperage, resistance, electronic components, and 4-20 mA loops. Identify different categories of Digital Multimeter (DMM) and the appropriate application			
7. Use cable and wire toners to locate circuits			
8. Use CMMS to document maintenance, repairs, check spare part inventory, identify parts needed to complete a job, and order as needed			
9. Identify and assess the health and functionality of different pumps and blowers			
How would you rank Domain 3 based on what you selected for each Sub-Domain?			
Domain 4 - Documentation and Foundational Principles			
Sub-Domain 4.1 - Documentation			
1. At a basic level, read and interpret blueprints, wire and other diagrams, schematics, and electrical diagrams			
2. Read basic PLC and other logic programs, including ladder logic, line, and function block programs			
3. At a basic level, participate in the design of electrical systems as necessary			
4. At a basic level, recommend development or changes to specifications			
5. Maintain service records and daily logs			
6. At a basic level, identify sources and participate in development of specification for requisitions for parts and electrical equipment			
Sub-Domain 4.2 - Foundational Principles			
1. Understand basic mechanical principles including length, width, levers, and pulleys			
2. Understand basic electrical principles including Ohm's law, basic power, and energy consumption			
3. Understand basic electronic principles including diodes, transistors, rectifiers, resistors, capacitors, coils, batteries, and inductors			
How would you rank Domain 4 based on what you selected for each Sub-Domain?			
Domain 5 - Math			
Sub-Domain 5.1 - Math			
1. Measure dimensions accurately			
2. Calculate area			
3. Calculate volume			
4. Calculate flow			
5. Calculate velocity			
6. Calculate pressure / head			
7. Compute rate, ratio, and percent			
8. Draw and interpret graphs			
9. Compute ratings for motor overloads			

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Electrical & Instrumentation Technologist Grade 2

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
Domain 1 - Installation and Configuration			
Sub-Domain 1.1 - Installation			
1. Plan, install, modify and test water / wastewater site electrical equipment.			
2. Research, design, replace, and install equipment and/or upgrade existing electrical/electronic systems			
3. Understand basic cogeneration components and how cogeneration works			
4. Install solar and wind generation systems as applicable, batteries, battery chargers, and uninterruptable power supplies (UPS)			
5. Install pneumatic control valves and understand the configuration of the control scheme			
Sub-Domain 1.2 - Configuration			
1. Perform the configuration of process and instrumentation diagrams (P&ID), control loop parameters and logic for programmable logic controllers (PLC) and control systems			
2. Configure variable frequency drives (VFDs), electromechanical valves, instrumentation (level sensors), pressure/temperature/flow transmitters, and similar analyzing instruments used in water / wastewater systems			
3. Configure pneumatic and hydraulic control valves and sensors			
4. Recommend adjustments, installation, and replacements for system improvements			
How would you rank Domain 1 based on what you selected for each Sub-Domain?			
Domain 2 - Maintenance and Repair			
Sub-Domain 2.1 - Systems			
1. Maintain, repair, and configure electronic systems and Soft Starts			
2. Identify, troubleshoot, adjust, and repair low voltage electrical problems in water / wastewater facilities			
3. Maintain and repair electrical and electronic operational control, recording, and alarm systems			
4. Test, locate, repair, and replace damaged electrical circuitry, communication systems			
5. Understand basics of fiber optic systems			
6. Read and interpret electrical schematics, including power distribution, motor control centers (MCCs), and programmable logic controller (PLC) control panels			
7. Read and interpret process and instrumentation diagrams (P&ID), process flow diagrams (PFD), loop diagrams, functional diagrams, and networking diagrams including fiber optic, copper, and wireless installations			

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8. Identify equipment details from manuals and manufacturer documentation			
9. Identify all components inside a PLC control panel, MCC bucket, Low Voltage (600V) and Medium Voltage (4160V) soft starters, and VFD control panels			
10. Identify when system equipment is operating outside of specifications and the impact on system efficiency and maintenance			
Sub-Domain 2.2 - Equipment and Parts			
1. Maintain, repair, troubleshoot, and replace electrical and electronic equipment, including motors, pumps, generators, controllers, switchboards, switches and electronic boards, circuitry, and components			
2. Repair or replace defective or inoperative electrical parts in communication hubs, motors, generators, pumps, controllers, switches, and other facilities and equipment			
3. Troubleshoot, test, locate, correct, and repair defects in instrumentation and electronic control equipment			
4. Maintain a variety of electronic control components used in operating electrical and mechanical equipment			
5. Assist in solar, battery, and uninterruptable power supplies (UPS) maintenance			
6. Demonstrate a basic understanding of conduit bending and installation			
Sub-Domain 2.3 - Coordination of Repair and Maintenance			
1. Coordinate repair and maintenance activities with operators and outside agency technical personnel to ensure water / wastewater processes are not impacted			
How would you rank Domain 2 based on what you selected for each Sub-Domain?			
Domain 3 - Safety, Tools, and Equipment			
Sub-Domain 3.1 - Safety			
1. Identify and understand occupational hazards and safety precautions necessary when working with Direct Current (DC) and Alternating Current (AC) power and voltages up to 600V maximum			
2. Understand the effects of hazardous chemical conditions encountered in water / wastewater treatment facilities and demonstrate knowledge of safety data sheets (SDS)			
3. Perform confined space entries per CalOSHA regulations and safely use self-contained breathing apparatus (SCBA)			
4. Inspect electrical equipment and lighting to ensure safe and satisfactory functioning			
5. Follow all OSHA guidelines, use safe work working practices, and report hazardous work conditions			
6. Understand Arc Flash and boundaries, classified areas, and perform Lockout Tagout (LOTO)			
7. Understand personal protective equipment (PPE) needs in electrical, mechanical, and chemical areas			
Sub-Domain 3.2 - Codes			
1. Understand applicable electrical codes (including the National Electrical Code pertaining to industrial and commercial, the California Electrical Code, NFPA 820, 70, and 70E) for water professionals			
Sub-Domain 3.3 - SCADA			

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1. Use a programming device to communicate with the SCADA system, PLCs, controllers, RTUs, radios, and smart instruments			
2. Assist in the maintenance and general programming of SCADA system			
3. Understand the methods, practices, and equipment used in the installation, construction, repair, maintenance, testing, and adjustment made to SCADA systems used in water / wastewater treatment operations			
4. Understand SCADA hardware components (field instruments, PLCs, desktops, servers, graphical user interface), and software components (PLC/RTU programming, SCADA programming/configuration, communication protocols and configuration)			
5. Understand networking protocols including VLAN partitions			
Sub-Domain 3.4 - Tools and Equipment			
1. Use a variety of diagnostic and test equipment including computers and other specialized equipment and devices to calibrate, repair, and maintain water / wastewater systems			
2. Use and operate a variety of electrical, electronic, and mechanical tools, instruments, and equipment			
3. Research equipment and parts information and order the necessary parts to maintain equipment and make effective repairs			
4. Understand the programming of controllers used in water / wastewater treatment systems			
5. Use appropriate measuring instrument to test voltage, amperage, resistance, electronic components, and 4-20 mA loops. Identify different categories of Digital Multimeter (DMM) and the appropriate application			
6. Use cable and wire toners to locate circuits			
7. Use CMMS to document maintenance, repairs, check spare part inventory, identify parts needed to complete a job, and order as needed			
8. Identify and assess the health and functionality of process equipment in water / wastewater treatment facilities (e.g., pumps, blowers, etc.)			
9. Maintain electrical metering and telemetering equipment			
10. Perform tool maintenance and general clean-up of tools, equipment, and work areas			
11. Understand the difference between water and wastewater cleanliness for tools			
How would you rank Domain 3 based on what you selected for each Sub-Domain?			
Domain 4 - Documentation and Foundational Principles			
Sub-Domain 4.1 - Documentation			
1. Prepare, read, and/or interpret prints, P&IDs, wire diagrams, schematics, and other diagrams			
2. Read basic PLC and other logic programs, including ladder logic, line, and function block programs			
3. Participate in the design of electrical systems as necessary			
4. Recommend development or changes to specifications			
5. Maintain service records and daily logs			
6. Identify sources and participate in development of specification for requisitions for parts and electrical equipment			

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Sub-Domain 4.2 - Foundational Principles			
1. Understand basic mechanical principles including length, width, levers, and pulleys			
2. Understand basic thermodynamics			
3. Understand basic electrical principles including Ohm's law, basic power, and energy consumption			
4. Understand basic electronic principles including diodes, transistors, rectifiers, resistors, capacitors, coils, batteries, and inductors			
How would you rank Domain 4 based on what you selected for each Sub-Domain?			
Domain 5 - Administration and Training			
Sub-Domain 5.1 - Administration			
1. Estimate cost, time, and labor requirements			
2. Requisition materials			
3. Record and schedule maintenance work			
4. Prepare bill of materials for all work and repair including parts, trade descriptions, and cost			
5. Build and maintain positive working relationships with coworkers, other employees, and the public using principles of good customer service			
6. Understand basic budgeting			
7. Create equipment repair and operations instructions			
Sub-Domain 5.2 - Training			
1. Assist in the training of operations and maintenance personnel on the safe operation of new or modified electrical systems and equipment			
2. Assist in the training of subordinate personnel			
How would you rank Domain 5 based on what you selected for each Sub-Domain?			
Domain 6 - Math			
Sub-Domain 6.1 - Math			
1. Measure dimensions accurately			
2. Calculate area			
3. Calculate volume			
4. Calculate flow			
5. Calculate velocity			
6. Calculate pressure / head			
7. Compute rate, ratio, and percent			
8. Draw and interpret graphs			
9. Compute amperage rating for conductors			
10. Compute ratings for motor overloads			

Electrical & Instrumentation Technologist Grade 3

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
Domain 1 - Installation, Inspection, and Design			
Sub-Domain 1.1 - Installation			
1. Participate directly in site upgrades and the planning of new construction			
2. Participate directly in the installation and testing of system-wide electrical infrastructure and control strategies in accordance manufacturer procedures and standard industry practice			
3. Understand basic installation and operational principles of medium voltage (above 4160V) power generation equipment, switchgear, and protective devices			
4. Understand basic installation practices for fiber optic cabling and interface devices			
5. Interface with vendors, computer software and hardware specialists, engineers, and plant operating personnel in order to obtain information to meet water / wastewater system electrical and instrumentation objectives			
6. Serve as the project point of contact in the installation of electrical, instrumentation, and control equipment, circuits, and components			
7. Recommend solar and wind generation systems as applicable, batteries, battery chargers, uninterruptable power supplies (UPS), cogeneration systems, and other new electrical equipment			
8. Evaluate and recommend instrumentation, electrical distribution, control systems, and network protocols			
9. Understand proper grounding of medium voltage (MV) equipment			
10. Review and comment on construction plans and specifications prior to the public bid process			
Sub-Domain 1.2 - Inspection			
1. Perform testing on electrical equipment, circuits, and components to identify abnormalities such as shorts, ground faults, open circuit conditions, and insulation/dielectric strength breakdown			
2. Perform ultrasonic testing on electrical equipment to identify possible fault conditions			
3. Understand and interpret thermography testing results of electrical equipment to identify possible fault conditions			
4. Understand and interpret vibration analysis results of electrical equipment to identify possible fault conditions			
5. Assist with capital improvement project quality control inspections			
Sub-Domain 1.3 - Design			
1. Participate in the design of logic instructions and programs using one of the International Electrotechnical Commission (IEC 61131-3) programming languages			

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2. Participate in the design of various control, data, power, and process system			
3. Participate in the review and design of process analyzer installations			
4. Participate in the review and design of motor control circuits			
How would you rank Domain 1 based on what you selected for each Sub-Domain?			
Domain 2 - Maintenance and Repair			
Sub-Domain 2.1 - Systems			
1. Supervise and perform maintenance, repair, configuration, and troubleshooting of complex electrical instrumentation, and control system equipment			
2. Recommend equipment modifications or upgrades to improve safety and process efficiency			
3. Understand proper bus transfer procedures			
4. Oversee staff and electrical contractors hired to ensure the completion of safe and compliant projects			
5. Perform calibration of instruments, maintain records, and document results			
Sub-Domain 2.2 - Equipment and Parts			
1. Maintain, repair, troubleshoot, and replace electrical and electronic equipment, including motors, pumps, generators, controllers, switchboards, switches and electronic boards, circuitry, and components			
2. Repair or replace defective or inoperative electrical parts in communication hubs, motors, generators, pumps, controllers, switches, and other facilities and equipment			
3. Troubleshoot, test, locate, correct, and repair defects in instrumentation and electronic control equipment			
4. Maintain a variety of electronic control components used in operating electrical and mechanical equipment			
Sub-Domain 2.3 - Coordination of Repair and Maintenance			
1. Coordinate repair and maintenance activities with operators and outside agency technical personnel to ensure optimal efficiency of procedures and process			
2. Provide technical supervision, inspection, and coordination over control system modifications by contractors			
3. Schedule, assign, and follow up on preventative and corrective maintenance of equipment using computer maintenance management systems (CMMS)			
4. Communicate alternate steps with staff and contractors in the event that failures occur			
How would you rank Domain 2 based on what you selected for each Sub-Domain?			
Domain 3 - Safety, Tools, and Equipment			
Sub-Domain 3.1 - Safety			
1. Evaluate working conditions to recognize hazardous chemical conditions in water / wastewater settings			
2. Consult Safety Data Sheets (SDS) to establish proper handling procedures, protective equipment, first aid, firefighting, and accidental release measures			
3. Perform confined space entries per Cal-OSHA regulations			

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4. Use personal protective equipment (PPE) in alignment with regulatory authority and manufacturer instructions			
5. Identify potential occupational hazards and employ appropriate hazard control methods (elimination, substitution, engineering controls, administrative controls, PPE, etc.)			
6. Monitor subordinate personnel to ensure regulatory and agency precautions and procedures are understood and followed			
7. Employ regulatory and agency compliant energy control plan			
8. Execute agency standard operating procedures (SOPs) to negate hazardous energy under energy control plan			
9. Assist in the development and implementation of agency safety and training programs			
10. Identify and understand occupational hazards and safety precautions necessary when working with Direct Current (DC) and alternating current (AC) power at low and medium voltages			
Sub-Domain 3.2 - Codes			
1. Understand and apply National Fire Protection Association (NFPA) 70E Standards for Electrical Safety in the Workplace			
2. Understand and apply National Fire Protection Association (NFPA) 70 National Electrical Code (NEC)			
3. Understand and apply National Fire Protection Association (NFPA) 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities			
4. Understand and apply California Occupational Safety and Health Administration (Cal-OSHA) Title 8 D1C4.5 Electrical Safety Orders			
5. Understand and apply the California Electrical Code (CEC)			
Sub-Domain 3.3 - SCADA			
1. Participate in the development and implementation of functional requirements, specifications, purchase, and commissioning of highly complex computer-based systems for monitoring and control of water / wastewater facilities			
2. Operate and manage the SCADA system to reflect the current condition of the utility system			
3. Perform preventative and corrective maintenance on process instruments and controllers in accordance with manufacturer instructions			
4. Perform verifications and calibrations on process instruments and controllers in accordance with manufacturer instructions or industry practice			
5. Install and perform initial configuration on controllers and instruments in accordance with manufacturer instructions or industry practice			
6. Direct and participate in the development and implementation of all database modifications in computer-directed control systems for equipment additions, modifications, and deletions for current system operation			
7. Assist in checking control loops, validating telemetry inputs and outputs, and assuring proper PLC and SCADA system functionality			
Sub-Domain 3.4 - Tools and Equipment			

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1. Operate computer terminals, portable programming units, and complex electrical test equipment			
2. Clean and replace control apparatus and associated equipment on all types of electrical devices, motors, controls, panels, and switchboards			
3. Use a variety of diagnostic and test equipment including meggers, volt meters, ohm meters, scope meters, phase rotation meters			
4. Understand the uses of oscilloscopes and optical time-domain reflectometers (OTDR), frequency generators, hi-pot, thermal and ultrasonic measuring devices, and vibration analysis			
5. Arrange for and participate in rigging and hoisting heavy electrical equipment in electrical installations			
6. Inspect, clean, lubricate, and replace bearing, brushes, and auxiliary equipment on large high voltage motors and generators			
7. Identify tools and equipment used in the installation, testing, maintenance, and repair of electronic systems, meters, telemetering and instrumentation equipment, microprocessors, and related items			
How would you rank Domain 3 based on what you selected for each Sub-Domain?			
Domain 4 – Documentation and Foundational Principles			
Sub-Domain 4.1 – Documentation			
1. Create preliminary and post-construction drawings of equipment modifications and new installations			
2. Prepare, read, and interpret technical illustrations, prints, maps, plans, specifications, schematics, and other diagrams			
3. Prepare wiring diagrams, material lists, and cost estimates			
4. Manage data files, develop record keeping procedures, and draft forms and reports			
5. Review and comment on construction plans and specifications prior to the public bid process			
6. Document as-built changes made to electrical or control systems (e.g., autocad, visio, red lines, etc.)			
7. Read advanced PLC and other logic programs, including ladder logic, line, function block and structured text programs			
8. Lead the design of electrical systems as necessary			
9. Lead development or changes to specifications			
Sub-Domain 4.2 – Foundational Principles			
1. Understand general principles and practices of electrical engineering and data processing, including electrical circuits, AC/DC electrical power supplies, and supervisory controls			
2. Understand modern methods and techniques used in maintaining and operating a wide variety of substation and central control systems, and communication equipment			
3. Understand functional, operational, and testing principles of solid-state electronics, solid-state and electro-mechanical controls, and real-time computer control systems.			
4. Understand principles and practices of PLC programming, theory and operation of digital computers, PLCs, and water / wastewater instrumentation.			
5. Understand electrical principles including Ohm's law, Kirchoff's law, power, and energy consumption			

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6. Understand thermodynamics related to electrical and instrumentation in water / wastewater settings			
How would you rank Domain 4 based on what you selected for each Sub-Domain?			
Domain 5 - Administration and Training			
Sub-Domain 5.1 - Administration			
1. Estimate cost, time, and labor requirements			
2. Requisition materials			
3. Record and schedule maintenance work			
4. Prepare bill of materials for all work and repair including parts, trade descriptions, and cost			
5. Interface with engineering and operations divisions of the electric and water systems to assist in the development and implementation of goals, objectives, policies, and priorities			
6. Prepare required plans and secure permits			
7. Assist in budget preparation and administration			
8. Perform, check, and supervise implementation of station and central control projects in close communication with utility personnel			
9. Coordinate and prepare request for bid documents			
10. Generate reports based on CMMS data, service records and daily logs			
Sub-Domain 5.2 - Training			
1. Supervise, train, and evaluate subordinate personnel			
2. Provide technical advice and support to all staff			
3. Assist in the development and implementation of training programs			
4. Assist in providing network security training			
How would you rank Domain 5 based on what you selected for each Sub-Domain?			
Domain 6 - Math			
Sub-Domain 6.1 - Math			
1. Calculate values common to electrical circuits and instrumentation devices			
2. Draw and interpret complex graphs			
3. Perform basic algebra and trigonometry in determining values for more complex calculations			
4. Understand decimal, binary, octal, and hexadecimal number systems			
5. Calculate complex equations for volume and flow			
How would you rank Domain 6 based on what you selected for each Sub-Domain?			
You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Electrical & Instrumentation Technologist Candidate Handbook.			

Electrical & Instrumentation Technologist Grade 4

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
Domain 1 - Installation, Inspection, and Design			
Sub-Domain 1.1 - Installation			
1. Schedule, assign, oversee, and participate in the installation of electrical equipment including switchgear, controllers, electric motors, motor control centers, etc.			
2. Supervise and participate in the installation and testing of system-wide electrical infrastructure and control strategies, including conduit, wiring, relays, control and timing devices, electronic metering, and telemetering equipment			
3. Supervise and participate in site upgrades and the planning of new construction			
4. Supervise and participate in the installation and testing of system-wide electrical infrastructure and control strategies in accordance manufacturer procedures and standard industry practice			
5. Understand the requirements for electric vehicle charging station installation.			
6. Understand the components, benefits, and challenges of various renewable energy sources (solar, wind, biogas, etc.) in order to participate in the design and oversee implementation, construction, and acceptance testing of renewable energy supply projects			
Sub-Domain 1.2 - Inspection			
1. Inspect existing electrical equipment, circuits, and control systems to ensure compliance with all applicable regulatory requirements			
2. Inspect new construction and upgrades to electrical equipment, circuits, and control system to ensure compliance with all applicable regulatory requirements			
3. Review plans and specifications for new construction and retrofit work for compliance with all regulatory and agency requirements			
4. Perform capital improvement project quality control inspections			
Sub-Domain 1.3 - Design			
1. Design of logic instructions and programs using one of the International Electrotechnical Commission (IEC 61131-3) programming languages			
2. Design various control, data, power, and process systems			
3. Review and design process analyzer installations			
4. Review and design motor control circuits			

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How would you rank Domain 1 based on what you selected for each Sub-Domain?			
Domain 2 - Maintenance and Repair			
Sub-Domain 2.1 - Systems			
1. Understand the principles and practices of maintenance and repair to electrical systems, industrial electrical control systems, radio and fiber optic communication networks, and electronic services			
2. Plan, prioritize, assign, supervise, and review the work of staff involved in the maintenance and repair of utility-related industrial electrical controls and systems, and electronic communication systems			
3. Understand the principles, practices, and uses of computers, programmable logic controllers (PLC), smart relays, transducers, and other SCADA and telemetry equipment in the electrical maintenance field			
4. Understand the principles, practices, and uses of electrical and instrumentation			
Sub-Domain 2.2 - Equipment and Parts			
1. Oversee the maintenance, repair, troubleshooting, and replacement of all electrical equipment, controls, and instrumentation			
2. Oversee maintenance and repair to cogeneration equipment, electrical distribution equipment (wiring, switchgear, breakers, etc.), motor control centers, motors, and all other electrical equipment			
3. Supervise and participate in troubleshooting and repair defects in complex electrical and electronic circuits and instrumentation equipment			
4. Identify and correct SCADA and PLC programming issues			
5. Schedule, assign, supervise, and participate in the maintenance and repair of all electrical and electronic equipment			
6. Understand, in depth, maintenance and repair principles and practices related to solid state devices, circuits, wiring, and equipment			
7. Understand rigging and hoisting requirements for heavy equipment			
8. Understand, in depth, requirements of solar, wind, battery, battery back-up, and uninterruptable power supplies (UPS) maintenance			
9. Understand internal functioning and connections motors, generators, and other rotating electrical equipment			
How would you rank Domain 2 based on what you selected for each Sub-Domain?			
Domain 3 - Safety, Tools, and Equipment			
Sub-Domain 3.1 - Safety			
1. Ensure all work is performed in compliance with all applicable safety regulations, laws, and requirements			
2. Oversight of all NFPA 70E Arc-Flash safety regulatory compliance			
3. Understand Hazardous Energy Control Program requirements, including LOTO procedures and safe working practices on or in proximity to energized low and high voltage conductors and equipment			
4. Evaluate working conditions to recognize hazardous chemical conditions in water / wastewater settings			

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5. Identify potential occupational hazards in water / wastewater settings and employ appropriate hazard control methods (elimination, substitution, engineering controls, administrative controls, PPE, etc.)			
6. Ensure equipment manuals and documentation are up to date			
7. Oversee the development and implementation of agency safety programs			
8. Oversee confined space entries per Cal-OSHA regulations			
9. Monitor the use personal protective equipment (PPE) in alignment with regulatory authority and manufacturer instructions			
10. Monitor subordinate personnel to ensure regulatory and agency precautions and procedures are understood and followed			
11. Develop and oversee regulatory and agency compliant energy control plan			
12. Develop agency standard operating procedures (SOPs) to negate hazardous energy under energy control plan			
13. Identify and understand occupational hazards and safety precautions necessary when working with Direct Current (DC) and alternating current (AC) power at low and medium voltages			
Sub-Domain 3.2 - Codes			
1. Understand and ensure compliance with all applicable regulatory requirements with regard to safety and industry best practice			
2. Ensure compliance with the California Electrical Code (CEC),			
3. Ensure compliance with the National Fire Protection Association (NFPA) 70 National Electrical Code (NEC)			
4. Ensure compliance with the National Electrical Safety Code			
5. Ensure compliance with the National Fire Protection Association (NFPA) 70B, Recommended Practice for Electrical Equipment Maintenance (NFPA 70B)			
6. Ensure compliance with the National Fire Protection Association (NFPA) 70E Standards for Electrical Safety in the Workplace			
7. Ensure compliance with the National Fire Protection Association (NFPA) 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities			
8. Ensure compliance with the California Occupational Safety and Health Administration (Cal-OSHA) Title 8 D1C4.5 Electrical Safety Orders			
Sub-Domain 3.3 - Tools and Equipment			
1. Operate a variety of electrical and electronic programming, diagnostic, and test equipment			
2. Understand, in depth, the tools and equipment used in the construction, installation, maintenance, and repair of electrical systems			
3. Develop calibration and maintenance program for electrical and electronic programming, diagnostic, and test equipment			
How would you rank Domain 3 based on what you selected for each Sub-Domain?			
Domain 4 - Documentation			

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Sub-Domain 4.1 - Documentation			
1. Prepare field drawings and estimates for electrical maintenance purposes			
2. Prepare, read, and interpret technical illustrations, prints, maps, plans, specifications, schematics, manuals, wiring diagrams, pneumatic diagrams, P&ID diagrams, electrical diagrams, and loop diagrams			
3. Generate sketches and layouts for electrical construction, alterations, replacement, or extension			
4. Supervise and assist in documenting updates and changes made to electrical or control systems (e.g., field changes, autocad, visio, red lines, etc.)			
5. Ensure compliance with regulatory documentation requirements			
How would you rank Domain 4 based on what you selected for each Sub-Domain?			
Domain 5 - Administration			
Sub-Domain 5.1 - Staffing			
1. Participate in the selection and recommendation of the appointment of personnel			
2. Supervise, plan, lay out, assign, coordinate, schedule, review, and inspect the work of subordinates			
3. Establish performance standards for personnel, implement discipline procedures, and work with staff to correct deficiencies			
4. Oversee, coordinate, and document staff training			
5. Oversee, coordinate, and document safety training for subordinates			
6. Participate in employee development and advancement initiatives and succession planning			
Sub-Domain 5.2 - Policies and Procedures			
1. Participate in the development and implementation of policies and procedures and monitor work activities to ensure compliance			
2. Evaluate operations and activities of assigned responsibilities and recommend improvements and modifications			
3. Develop and recommend policies and procedures related to assigned operations			
4. Recommend and assist in the implementation of goals and objectives			
Sub-Domain 5.3 - Budgeting			
1. Participate in budget preparation, development, and administration			
2. Prepare cost estimates for budget recommendations			
3. Develop and submit justifications for equipment, materials, and supplies			
4. Monitor and control expenditures			
Sub-Domain 5.4 - Reports and Records			
1. Prepare material lists and estimates for costs, time, and labor requirements			
2. Oversee and maintain inventory or electrical and electronic parts, materials, equipment, and supplies			

Gap Analysis Tool

3. Prepare various reports on operations and activities, including time, work, and material reports			
4. Keep maintenance logs and other records			
5. Use CMMS to document maintenance, repairs, and inventory			
6. Maintain and evaluate records of electrical maintenance, repair, and inspection activities			
7. Prepare required plans and secure electrical permits			
8. Understand and comply with all document and record retention policies			
Sub-Domain 5.5 - Coordination and Review			
1. Assist in coordinating electrical services activities with other departments, divisions, and outside agencies			
2. Review plans and specifications for contract work and inspect work performed by contractors to ensure compliance with standards			
3. Respond to inquiries and provide information to the public			
4. Investigate complaints and recommend corrective action			
5. Establish and maintain effective working relationships with those contacted in the course of work, including peers, operators, direct reports, superiors, vendors, contractors, customers, and the public			
6. Respond to and maintain order in emergency situations			
How would you rank Domain 5 based on what you selected for each Sub-Domain?			
You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Electrical & Instrumentation Technologist Candidate Handbook.			