

# Electrical Engineer Job Description

Job Group: Engineering

Researches, develops, designs, and tests electrical components, equipment, and systems, applying principles and techniques of electrical engineering: Designs electrical equipment, facilities, components, products, and systems for commercial, industrial, and domestic purposes. Designs and directs engineering personnel in fabrication of test control apparatus and equipment, and determines methods, procedures, and conditions for testing products. Develops applications of controls, instruments, and systems for new commercial, domestic, and industrial uses. Directs activities to ensure that manufacturing, construction, installation, and operational testing conform to functional specifications and customer requirements. May direct and coordinate operation, maintenance, and repair of equipment and systems in field installations. May specialize in specific area of discipline, such as electrical energy generation, transmission, and distribution systems; products, such as appliances, generators, transformers, control devices, and relays; or area of work, such as manufacturing, applications, or installation. May use computer-assisted engineering and design software and equipment to perform engineering tasks.

## General Competencies Library

### Writing Skills

Communicating ideas and information in writing to ensure that information and messages are understood and have the desired impact.

#### Level 4

##### Conveys complex information

- Writes on complex and highly specialized issues (e.g., complex policy, scientific or legal documents).
- Transforms technical information for a non-specialist audience, without "talking down" to them.
- Writes creative, promotional material designed to influence people's beliefs or behaviour.

### Analytical Thinking

Analyzing and synthesizing information to understand issues, identify options, and support sound decision making.

#### Level 4

##### Applies broad analysis

- Integrates information from diverse sources, often involving large amounts of information.
- Thinks several steps ahead in deciding on best course of action, anticipating likely outcomes.
- Develops conceptual frameworks that guide analysis by describing patterns of complex relationships among elements and events in the operating environment.

### Interactive Communication

Listening to others and communicating articulately, fostering open communication. (Persons with hearing impairments may lip read or use sign language.)

#### Level 4

##### Communicates complex messages

- Communicates complex issues clearly and credibly with widely varied audiences.
- Handles difficult on-the-spot questions (e.g., from senior executives, public officials, interest groups, or the media).
- Overcomes resistance and secures support for ideas or initiatives through high-impact communication.

## Problem Solving

Identifying problems and the solutions to them.

Level 4
Solves complex problems
<ul style="list-style-type: none"><li>• Identifies complex problems based on a broad range of factors, many of which are ambiguous or difficult to define.</li><li>• While remaining guided by organizational values, identifies optimal solutions, thinking first in terms of possible approaches and flexibilities in the system vs. blind adherence to rules or procedures.</li><li>• Evaluates the effectiveness and efficiency of solutions after they have been implemented and identifies needed changes.</li></ul>

## Planning and Organizing

Developing, implementing, evaluating and adjusting plans to reach goals, while ensuring the optimal use of resources.

Level 4
Plans and organizes multiple, complex activities
<ul style="list-style-type: none"><li>• Identifies and prioritizes resources across initiatives/programs.</li><li>• Ensures that activities are not duplicated.</li><li>• Ensures that systems are implemented to monitor and evaluate progress and use of resources (e.g. financial, non-financial, historical and prospective information).</li><li>• Ensures that outcomes are evaluated.</li><li>• Ensures coordination, as needed, across related projects.</li></ul>

## Team Leadership

Assuming a leadership role in helping others achieve excellent results.

Level 3
Builds strong teams
<ul style="list-style-type: none"><li>• Identifies and addresses gaps in team expertise.</li><li>• Resolves conflict among team members fairly and sensitively.</li><li>• Delegates authority to match responsibility, and holds staff accountable for agreed upon commitments.</li><li>• Coaches and supports staff in taking independent action.</li><li>• Delegates responsibility rather than taking charge or micro-managing when staff have the capability.</li></ul>

## Critical Judgment

Evaluating ideas and information while referring to objective criteria to reach rational conclusion.

Level 4
Formulates broad strategies on multi-dimensional strategic issues
<ul style="list-style-type: none"><li>• Maintains a broad, strategic perspective while identifying and focusing on crucial details.</li><li>• Demonstrates broad and rich understanding of the dynamic relationships, viewpoints and agendas, both acknowledged and implicit, of key players and stakeholders.</li><li>• Makes complex recommendations for which there is no set precedent.</li><li>• Considers a multiplicity of interrelated factors for which there is incomplete and contradictory information.</li><li>• Balances competing priorities in making recommendations.</li></ul>

## Visioning and Alignment

Supporting, promoting and ensuring alignment with the organization's vision and values.

Level 3
Aligns program/ operational support
<ul style="list-style-type: none"><li>• Develops and implements programs and processes aligned with the strategic direction and vision.</li><li>• Monitors current developments and trends that may affect implementation of organizational direction, programs or plans.</li></ul>

## Technical Competencies Library

### Calibration / Mathematics

Knowledge and application of arithmetic, algebra, geometry, calculus, statistics.

#### Level 4

- Calculates using multiple steps and operations.
- Uses advanced mathematical techniques and calculations.

### Working with Tools and Technology

Operating hand and power tools of all types.

#### Level 4

- Welds, repairs, and fabricates equipment or machinery.
- Shrink-fits bushings, sleeves, rings, liners, gears, and wheels to specified items, using portable gas heating equipment.
- Fabricates and dismantles parts, equipment, and machines using a cutting torch or other cutting equipment.
- Dismantles machinery and equipment for shipment to installation site, usually performing installation and maintenance work as part of team.
- Connects power unit to machines or steam piping to equipment, and tests unit to evaluate its mechanical operation.
- Troubleshoots equipment, electrical components, hydraulics, or other mechanical systems.
- Constructs foundation for machines, using hand tools and building materials such as wood, cement, and steel.
- Operates engine lathe to grind, file, and turn machine parts to dimensional specifications.

### Building & Construction Design

Understands the steps involved in designing construction projects (e.g., planning, generating layouts, developing & interpreting drawings).

#### Level 4

**Advanced: Demonstrates advanced knowledge and ability, and can apply the competency in new or complex situations. Guides other professionals.**

- Applies surveying methods to problems of leveling, line direction, measurement of angles, measurement of distance, and transverse computations.
- Demonstrates knowledge of zoning, property lines, utilities, building line, setback, building corners, and elevation.
- Identifies the actual location/elevation.
- Uses lasers/levels/transits to check alignment and elevations.
- Identifies specific hazards and be aware of them while performing excavation tasks.

## Electrical Systems Maintenance and Repair

Combines knowledge of the workings of electrical equipment & standard electrical installation procedures in the repair and maintenance of electrical components and equipments.

### Level 4

**Advanced: Demonstrates advanced knowledge and ability, and can apply the competency in new or complex situations. Guides other professionals.**

- Coaches others on the rules and codes of the relevant electrical regulating authority and relevant local standards and codes of practice.
- Assesses electrical equipment risk prior to equipment inspection, testing, tagging and registration.
- Independently carries out inspection, testing and tagging of a wide range of electrical equipment.
- Guides other employees through complex troubleshooting and repair sequences.
- Assembles and installs electrical installations.

## Electrical/Electronics Engineering

Translates knowledge of the theory, concepts and principles underlining electrical/electronics engineering (field theory, analog electronics, computer aided design of circuits and control theory) in designing, developing, operating and testing electrical and electronic equipment, components or systems. Electrical Science and Technology – knowledge and application of the principles of generation, distribution, control and application of electrical power.

### Level 5

**Expert: Demonstrates expert knowledge and ability, and can apply the competency in the most complex situations. Develops new approaches, methods or policies in the area. Is recognized as an expert, internally and/or externally.**

- Supervises and inspects the installation, adjustment, operation, and testing of equipment and technology.
- Defines electrical maintenance procedure and operating standards.
- Handles extremely complex and problematic electrical maintenance and repair problems.
- Demonstrate technical skills for electromechanical engineering technology.
- Assesses requirements for a specific application to select appropriate motor or generator.
- Applies automated data acquisition technology to monitor system health.
- Employs feedback control and sensor in automated system.
- Designs, builds, troubleshoots fluid power systems (hydraulics / pneumatics).
- Explains use of machine sensor technology in a parts inspection application.

## Engineering Operations

Managing / coordinating ongoing engineering operations and making decisions to maximize the performance of the system in a dynamic environment.

## Electrical Equipment Operation

Ability to operate and perform daily preventive maintenance on gasoline/diesel powered engineering and construction equipment.

Level 5
<b>Expert</b>
<ul style="list-style-type: none"><li>• Explains in detail, the theory behind the workings of various gas and diesel machinery and hydraulic systems.</li><li>• Instructs others in the preventive maintenance of engineering and plant equipment.</li><li>• Operates a wide variety of construction and engineering equipments under difficult terrains/conditions (e.g. confined spaces, rocky surfaces, etc.)</li><li>• Performs work to fine specifications from grade stakes set by self.</li></ul>