

## ELECTRICAL ENGINEER I

### JOB DESCRIPTION

**Classification Responsibilities:** An Electrical Engineer I is an entry-level position which uses on-the-job training to develop skills and abilities to perform technical engineering tasks required for the City's electric distribution operations or Engineering Department's Design Group. Under the direction of an Electrical Engineer II, Senior Electrical Engineer, or Supervising Engineer, the Electrical Engineer I will assist with tasks by applying knowledge from academic studies, internships, and on-the-job training to size transformers; calculate electrical loads; determine conductor sizes; determine proper voltage configurations; calculate voltage losses for various conductor sizes, types, and lengths; determine proper sizing and placement of distribution poles, equipment, and facilities; perform drafting and design work utilizing GIS (Geographic Information Systems) and AutoCad to produce neat, precise, and well-balanced drawings for the construction and maintenance of overhead and underground, primary and secondary distribution circuits and facilities for the electric system. In addition, the employee in this class may assist in short-term and long-term planning and preparing special studies on the distribution systems and determining operational requirements for electrical loads utilizing electric modeling and analytical tools. This class will assist to define electric system improvement priorities; prepare cost estimates; provide budgetary input related to planning, operations, and the function of short- and long-term design of the electric distribution system; and develop material specifications for all materials used in the City's electric distribution system. This class performs related duties as required.

**Distinguishing Features:** The Electrical Engineer I will learn to perform specialized engineering and technical work related to the planning, design, and operation of the City's electric distribution system. The Electrical Engineer I classification differs from the Electrical Engineer II by the latter having significant experience in electric distribution operations, GIS, distribution system modeling/design, and registration as an Engineer-In-Training in a state that is acceptable to the State of Arizona, enabling performance of more difficult and varied professional engineering work assignments, with minimal direct supervision. Employees in this class may progress by noncompetitive promotion to Electrical Engineer II upon meeting the following criteria-based promotion requirements: three years as an Electrical Engineer I (or equivalent work experience), Engineer-in-Training (EIT) certification, and a demonstrated ability to work with other technical employees engaged in drafting and design work on the electric distribution system, which includes overhead and underground circuits and duct back systems. This class may be supervised by the Electrical Engineer II, Senior Electrical Engineer, or Supervising Engineer who reviews work through reports, conferences, meetings, inspections, and results achieved. This class is FLSA exempt-professional.

### QUALIFICATIONS

**Employee Values:** All employees of the City of Mesa are expected to uphold and exhibit the City's shared employee values of Knowledge, Respect, and Integrity.

**Minimum Qualification Required.** Graduation from an accredited college or university with a Bachelor's Degree in Electrical Engineering or related field, preferably with coursework in power systems concepts.

**Special Requirement.** Must possess a valid Arizona Driver's License by hire date.

**Substance Abuse Testing.** Due to the safety and/or security sensitive nature of this classification, individuals shall be subject to pre-employment or pre-placement alcohol, drug, and/or controlled substance testing as outlined in City policy and procedures.

**Preferred/Desirable Qualifications.** Some (6 months - 1 year) experience in electrical engineering, computer modeling (or related work with an electric utility) is preferred. This experience may include interning as or working directly for an electric utility or operation managing transmission and primary distribution systems. Experience using AutoCAD.

## **ESSENTIAL FUNCTIONS**

**Communication:** Communicates with the general public, City employees, vendors, management and consultants in order to ensure the operational integrity of the City's electric distribution system. Assists in the preparation of written documents including letters, reports, and required state and federal documents with clearly organized thoughts, proper sentence construction, punctuation, and grammar.

**Manual/Physical:** Operates a motor vehicle requiring a valid Arizona Driver's License to conduct site visits and to make field inspections, measurements, and field checks for proposed projects and completed work. Distinguishes colors to input GIS data. Assists in the preparations of plans, drawings, maps, reports and specifications for distribution to other consultants, developers, City departments and the public. Enters data and information into a personal computer (PC) or other keyboard device (labeling machine) to evaluate and analyze electrical load databases and generate various reports. Inspects, monitors, and evaluates electric utility and customer installations to determine compliance with the National Electric Safety Code (NESC), etc. Deciphers dispatch maps, Blue Stake markings, etc. Works in a variety of weather conditions while performing fieldwork. Lays out (measures and stakes) junction box and transformer locations in the field so the contractor can run secondary conduit to the point of service. Reviews the design of electrical engineering projects. Gathers on-site data in order to maintain vault records showing the location and size of each vault and manhole, cable switch positions, and the size of the conduit going into the vault. Operates standard office equipment including personal computers, printers, and plotters. Capable of moving objects of up to 50 pounds or more, such as roll paper, paper cartons, digitizing tablets, etc., for distances of up to 150 feet using a hand cart. Uses a variety of cleaning fluids, such as toners and clear dispersant, to clean equipment.

**Mental:** Works with engineers, developers, and technicians involved in performing electric engineering activities, including the preparation of job orders, construction drawings, schematic drawings, circuit maps, and electric system mapping. Works with electric field crews to determine acceptable placement of electrical facilities. Interprets work plans (proposed, as-builts, construction, site plans, blueprints, etc.). Through the Merchant Job Training and Safety Program, obtains an enhanced understanding of line materials and all aspects of line construction and related work. Applies knowledge gained from this program and previous educational coursework to size transformers, calculate electrical loads, establish conductor sizes to meet customer load requirements, establish proper voltage configurations to best meet customer needs, and calculate voltage losses for various conductor sizes and types, and establishes proper signing and placement of poles and equipment for primary and secondary circuits. Applies the techniques of drafting to produce neat, precise, and well-balanced maps and construction drawings.

Conducts research to ensure accuracy and completion of as-built drawings for locating and Blue-Staking purposes. Learns to digitize; utilize data for map layout and plotting; update maps as new information is obtained; operate a computer for inputting data used to create GIS maps; prepare GIS map products on a computer; identify and document problems; understand procedures, terminology, and the use of system menus and operational system panels; determine the accuracy of source information for building a map; perform detailed records research; and apply research to ensure the accuracy and completeness of GIS maps. Assists in the coordination of work activities with other City departments, agencies, and utility companies. Assists and supports the development of system operating and design procedures and policies. Performs mathematical calculations, structural load analysis, statistical computations and cost analysis to determine structural requirements, service delivery cost, and contributions-in-aid of construction. Understands and interprets project plans, schematic drawings, layouts, and other visual aids to plan and design necessary electric distribution system improvements. Learns job-related material through on-the-job training and classroom instruction regarding electric distribution system planning, design, and operation, including standard operating procedures, federal regulations (NESC, etc.) and City of Mesa Electric Standards and Codes and other City of Mesa Engineering Standards and Procedures. Inspects, monitors, and evaluates work-related information to determine compliance with standard operating and safety standards (NESC standards, regulations, and guidelines for Electric assignment).

**Knowledge and Abilities:**

Knowledge of:

electrical engineering principles and practices;  
electric system design principles/power systems concepts;  
symbols and terminology used in engineering drawings;  
construction plans and specifications;  
facilities, materials, equipment, and tools used in the construction and maintenance of electrical facilities; and  
essentials of algebra, geometry, trigonometry, and calculus.

Ability to:

learn and interpret instrumentation and control (I/C) diagrams, 1-line diagrams, and regulations associated with electric distribution system operations;  
learn to read and interpret construction drawings;  
use drafting equipment and related tools, including AutoCAD and GIS;  
learn to operate computer software and systems including MilSoft, Light Table, ArcFM, Responder, Designer, Microsoft Word, Excel, Power Point, Access, etc., City of Mesa computerized customer information systems, and proposed work flow/asset management systems;  
understand and write specifications;  
compute quantities and make cost estimates;  
prepare neat and precise maps from plans, sketches, verbal descriptions, and specifications;  
maintain a high level of attention-to-detail for quality control purposes;  
maintain effective documentation and system backups of maps and electronic data;  
assist in providing data and maps for detailed operational analysis;  
apply results of analysis to ensure accuracy and completion of map and related data profiles;

become familiar with industry-specific terminology and symbology; learn the existing ArcGIS/ArcFM GIS system; and establish and maintain effective working relationships with consultants, engineers, developers, City personnel, coworkers, management, public officials, and the general public.

The duties listed above are intended only as general illustrations of the various types of work that may be performed. Lack of specific statements of duties does not exclude them from the position if the work is similar, related, or a logical assignment to the position. Job descriptions are subject to change by the City as the needs of the City and requirements of the job change.

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INCREMENTS 43-200

PAY GRADE: 49

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