



WAGE DATA

| Rate Type / Statistical Type | Entry level | Mean | Experienced |
|------------------------------|-------------|----------|-------------|
| Annual wage or salary | \$61,522 | \$84,221 | \$94,020 |
| Hourly wage | \$28.47 | \$39.33 | \$47.18 |

JOB DESCRIPTION

Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

DUTIES

- Prepare technical drawings, specifications of electrical systems, or topographical maps to ensure that installation and operations conform to standards and customer requirements.
- Operate computer-assisted engineering or design software or equipment to perform engineering tasks.
- Confer with engineers, customers, or others to discuss existing or potential engineering projects or products.
- Direct or coordinate manufacturing, construction, installation, maintenance, support, documentation, or testing activities to ensure compliance with specifications, codes, or customer requirements.
- Design, implement, maintain, or improve electrical instruments, equipment, facilities, components, products, or systems for commercial, industrial, or domestic purposes.
- Prepare specifications for purchases of materials or equipment.
- Perform detailed calculations to compute and establish manufacturing, construction, or installation standards or specifications.
- Investigate customer or public complaints, determine nature and extent of problem, and recommend remedial measures.
- Oversee project production efforts to assure projects are completed on time and within budget.
- Plan or implement research methodology or procedures to apply principles of electrical theory to engineering projects.

TOOLS and TECHNOLOGY

Tools used in this occupation:

Laboratory evaporators — Electron beam evaporators, Filament evaporators, Metal evaporation systems, Vacuum system/thermal evaporators
Semiconductor process systems — Low pressure chemical vapor deposition LPCVD systems, Wafer steppers, Wet chemical clean benches, Wire bonders

Signal generators — Programmable function generators, Synthesized continuous wave CW generators, Vector signal generators

Spectrometers — Auger electron spectrometers, Electrochemical CV dopant profilers, Secondary ion mass spectrometers SIMS, X ray photoemission spectrometers

Tube furnaces — Doping tubes, Oxidation tubes, Vertical furnaces

Technology used in this occupation:

Analytical or scientific software — Hewlett-Packard HP Semiconductor Parameter Analyzer, Synopsys PrimeTime, Tektronix EZ-TEST, The MathWorks MATLAB

Computer aided design CAD software — Autodesk AutoCAD software, Cadence Encounter Test, MAGIC layout editor *, OrCAD Capture

Development environment software — C, Eclipse IDE software *, Programmed logic controller PLC code generation software, VHDL hardware description language VHDL

Object or component oriented development software — C++, JHDL, Python, Sun Microsystems Java

Operating system software — Microsoft Windows Server, UNIX

KNOWLEDGE

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

Mechanical — Knowledge of machines and tools including their designs, uses, repair, and maintenance.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

SKILLS

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

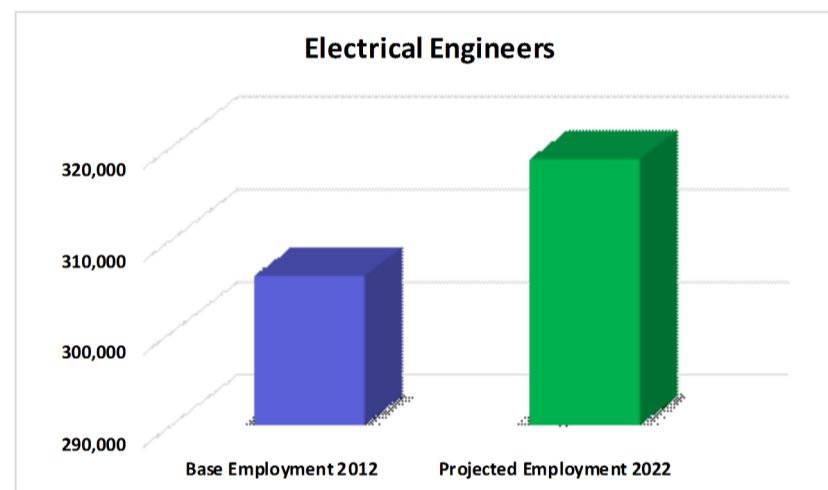
Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

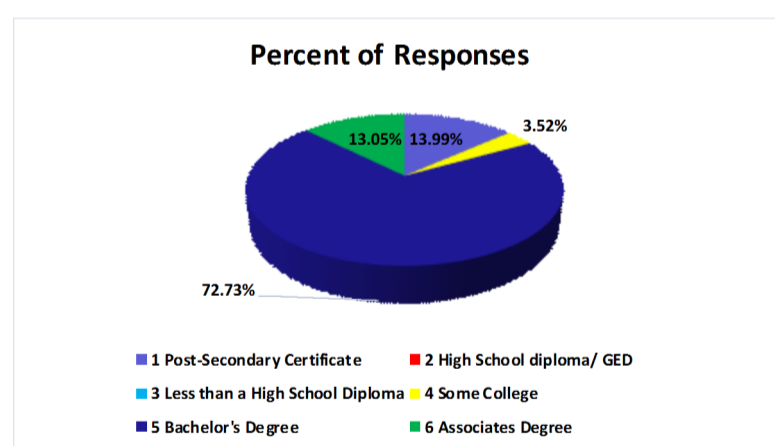
Writing — Communicating effectively in writing as appropriate for the needs of the audience.

EMPLOYMENT PROJECTION



EDUCATION

The graph below shows the results of a national survey listing the most common required level of education for Manufacturing Engineering.



EDUCATION FOR THIS JOB

- 2014 Catalogue of Colorado Advanced Manufacturing Program and Skill Resources
<http://www.coloradomanufacturingcareers.com/>
- Approved Colorado Community College Manufacturing Cluster education programs
<http://www.coloradocommunitycolleges.com/go/programs/skilled-trades-technical-sciences/>
<http://www.coloradocommunitycolleges.com/go/>
- Colorado Four Year Colleges and Universities
<http://higher.ed.colorado.gov/academics/colleges/public4year.asp>
- Locations to Get Manufacturing Certificates
<http://www.coloradomanufacturingcareers.com/>

