

CAREER INFORMATION

ELECTRICAL ENGINEERING & ELECTRONICS ENGINEERING TECHNOLOGY:

From the book:

“Engineering Education and Practice in the United States - Engineering Infrastructure Diagramming and Modeling”

Prepared by: Panel on Engineering Infrastructure Diagramming and Modeling, Committee on the Education and Utilization of the Engineer, Commission on Engineering and Technical Systems, National Research Council. Published by National Academy Press; Washington, D.C.; 1986; ISBN: 0-309-03639-9; Pages 74 - 75.

Background: In the late 1970's under the umbrella of what was then the Engineers' Council for Professional Development (ECPD), now Accreditation Board for Engineering and Technology (ABET), many of the engineering societies participated in a comprehensive review of definitions including that of engineering, the engineer, and the engineering technologist and technician. Their report entitled “*The Engineering Team*” was approved by the ECPD Board of Directors in 1979, and contained the following definitions and explanatory notes:

ELECTRICAL ENGINEERING: *Electrical Engineering* is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind.

Electrical Engineer: With a strong background in mathematics, the basic physical sciences, and the engineering sciences, the engineer must be able to interrelate engineering principles with economic, social, legal, aesthetic, environmental and ethical issues, extrapolating beyond the technical domain. The engineer must be a conceptualizer, a designer, a developer, a formulator of new techniques, a producer of standards - all to help meet societal needs. The engineer must plan and predict, systematize and evaluate - must be able to judge systems and components with respect to their relation to health, safety and welfare of people, and to loss of property. Innovation must be central to the engineer. The engineer will normally have received the first professional degree from an accredited engineering program, which requires a minimum of 1 ½ years of mathematics, beginning with differential and integral calculus. Education in engineering analysis and synthesis shall prepare the engineer to enter the profession with potential for further development in research, design, development, management, establishment of systems and translation of concepts into realities. An engineering education is the principle route to professional licensure.

ELECTRONICS ENGINEERING TECHNOLOGY: *Electronics Engineering Technology* is the part of the technological field that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer.

Electronics Engineering Technologist: The engineering technologist must be applications oriented, building on a background of applied mathematics through the concepts and applications of calculus. Based upon applied science and technology, the technologist must be able to produce practical, workable results quickly; install and operate technical systems; devise hardware from proven concepts; develop and produce products; service machines and systems; manage construction and production processes; and provide sales support for technical products and systems. Normally, the engineering technologist will hold a 4 - year degree from an accredited engineering technology program. Because of the key role as an implementer, the engineering technologist must be prepared to make independent judgments what will expedite the work without jeopardizing its effectiveness, safety or cost. And the technologist must be able to understand the components of systems and be able to operate the systems to achieve conceptual goals established by the engineer.

Electronics Engineering Technician: With a minimum of 2 - years of post-secondary education, ideally in engineering technology, with emphasis in technical skills, the engineering technician must be a doer, a builder of components, a sampler and collector of data. The technician must be able to utilize proven techniques and methods with a minimum of direction from an engineer or an engineering technologist. He / she will not be expected to make judgments which deviate significantly from proven procedures. The technician should expect to conduct routine tests, present data in a reasonable format, and be able to carry out operational tasks following well-defined procedures, methods and standards.

Conceive --- Innovate --- Develop --- Design --- Prototype --- Refine --- Manufacture --- Test --- Ship --- Operate --- Maintain

<<<<<<<< Theoretical Concepts ----- Applied Technology----- Established Skills >>>>>>>>

ELECTRICAL ENGINEER (BSEE)	ELECTRONICS ENGINEERING TECHNOLOGIST (BSEET)	ELECTRONICS ENGINEERING TECHNICIAN (AASEET)
Academic Preparation		
Bachelor of Science degree from an accredited Electrical Engineering program.	Bachelor of Science degree from an accredited Electronics Engineering Technology program.	Associate in Applied Science degree from an Electronics Engineering Technology program.
1 ½ years of mathematics including differential and integral calculus, and differential equations. Advanced calculus, linear algebra and statistics courses are typical electives.	1 ½ years of mathematics including college algebra, precalculus and first course in calculus with analytic geometry.	1 year of mathematics including college algebra and plane trigonometry.
1 year of general chemistry. 1 ½ years of general (calculus) physics.	1 year of technical (non-calculus) physics.	½ year of technical (non-calculus) physics.
Emphasis on engineering and computer sciences.	Emphasis on engineering and computer applications with laboratory and field orientation.	Emphasis on performing operational tasks following well-defined procedures to support engineering activities.
Interrelated engineering principles with economic, ergonomic, environmental, social, political, ethical and legal issues.	Apply technological methods and knowledge with technical skills to support engineering activities.	
Career Goals		
Research & Development	Technical Sales	Engineering Services
Advanced Technology Innovation	Applications Engineering	Laboratory Operations
New Business & Product Development	Manufacturing Operations	Operations Maintenance
New Product Development & Design	Quality Control	Product Analysis & Repair
Product, Program & Operations Management	Customer Support	Field Service
Duties & Responsibilities		
Conceptualizes & Innovates	Links Engineering to Markets & Customers	Builds & Tests Prototypes
Anticipates, Plans & Predicts	Translates Customer Requirements	Collects & Interprets Data
Develops & Designs	Translates Applications into Specifications	Prepares Technical Documentation
Provides Prototypes & Design Documentation	Translates Prototypes into Products	Maintains & Calibrates Equipment
Establishes Standards (Methods & Procedures) for Manufacturing and Service	Implements Established Standards (Methods & Procedures) in the Factory and the Field	Tests, Analyzes & Repairs Factory Products
Assures Performance, Schedule & Cost	Produces, Analyzes & Implements	Services Customer Products
Provides Judgment & Adjudicates Conflict	Oversees Manufacturing & Quality Control	
Makes Decisions (Technical & Non-Technical)	Oversees Customer Service	
Oversees Products, Programs & Operations		
Oversees Technology Business		

