LIFE AS A ELECTRONICS & TELECOMMUNICATION ENGINEER

WORK SKILLS, INTEREST & COMPETENCIES

Introduction

Electronics, particularly computer usage coupled with recent space age, has by this time already crept into every sphere of human activities. Every industry, institution & organization feels the need for an Electronics Engineer. Today's world is very much for and of the Electronics & Communication Engineers. Advanced countries in the world have gone to such depths of Electronics today that an Electronics Engineer is indispensable in every front.

Opportunity in this highly sophisticated and advanced branch of engineering is just immense. Electronics is now a part of our everyday life, from our pocket FM radio to televisions, computers, mobile phones and even the high-end satellites that process and send images.

With the advent of the advance technologies in this field the whole world is becoming very easily accessible. Electronics and Telecommunication is the mother branch of IT. This branch is having wide scope in the public sector, Private sector as well as in Government sector. The professionals of this field will find a very good future prospectus since so many multinational companies are indented in the field of telecommunication.

This branch has tremendous applications such as Telephony, Telegraphy, Radio & TV broadcasting, Paging, Mobile Communication, Video Conferencing, Internet, e-mail, e-commerce, Industrial Automation, Military etc. As such there is no limit to its applications and scope as well. Everyday you will find a new addition in the application of this field.

It is a versatile branch, in the sense that the students holding the degree in the Electronics and Telecommunication can build up his carrier in any field such as Computer Engineering, Information Technology and Telecommunication etc.

Definition:

Electronics and communication engineering is an engineering discipline which uses the scientific knowledge of the behavior and effects of electrons to develop components,

devices, systems, or equipment that uses electricity as part of its driving force. The engineering field encompasses many subfields including those that deal with power, instrumentation engineering, telecommunications, semiconductor circuit design, and many others.

Job Prospects

Electronics and Communication Products and Solutions are used in various industries across the world. Major Industries which offer Jobs for ECE engineers are

- Electronics Circuit Design
- Signal processing
- Wireless Communication
- Optical Communication
- Robotics
- Embedded Systems
- Analog electronics
- Digital electronics
- Telecommunications
- Power Electronics
- Consumer Electronics
- Solid State Physics
- Control systems
- VLSI
- Defense
- Nanotechnology
- Mobile Companies

TOP Companies which offer JOBS for ECE engineers are

- Intel
- AMD
- CISCO
- IBM
- Samsung Electronics

- Sony
- Toshiba
- Philips Semiconductors
- Nokia
- Nvdia
- HP
- LG Electronics
- Bharat Heavy Electrical's Limited (BHEL)
- Electronics Corporation of India Limited (ECIL)
- National Thermal Power Corporation (NTPC)
- Wipro
- HCL
- ISRO
- SYNTEL
- WIPRO

Skill Set Required for getting Jobs

In order to get Jobs in the above companies, one should have following skill sets

JOB Category	Required Skill Set
VLSI	Verilog and VHDL
Circuit Design	Electronics Circuit Design Basics
Chip Design	Transistor Process technology , Microprocessors
Mobile Communications	Network Switching, Communication Basics, Voice over Internet protocols and interactive voice recognition
Networking	CCNA or CCNP Certification.

LIFE OF A ELECTRONIC ENGINEER

Tasks

- Operate computer-assisted engineering and design software and equipment to perform engineering tasks.

- Design electronic components, software, products, or systems for commercial, industrial, medical, military, or scientific applications.
- Prepare engineering sketches or specifications for construction, relocation, or installation of equipment, facilities, products, or systems.
- Confer with engineers, customers, vendors or others to discuss existing and potential engineering projects or products.
- Analyze system requirements, capacity, cost, and customer needs to determine feasibility of project and develop system plan.
- Evaluate operational systems, prototypes and proposals and recommend repair or design modifications, based on factors such as environment, service, cost, and system capabilities.
- Develop or perform operational, maintenance, or testing procedures for electronic products, components, equipment, or systems.
- Provide technical support and instruction to staff or customers regarding equipment standards, assisting with specific, difficult in-service engineering.
- Inspect electronic equipment, instruments, products, or systems to ensure conformance to specifications, safety standards, or applicable codes or regulations.
- Plan or develop applications or modifications for electronic properties used in components, products, or systems to improve technical performance.

Tools & Technology

Tools used in this occupation:

Counters — Electronics counters

Light absorption meters — Wave meters

Multimeters

Signal generators — Function generators

Wattmeters

Technology used in this occupation:

Analytical or scientific software — Ansoft Simplorer; Synopsys Saber; The MathWorks Simulink; Visual Numerics PV-WAVE

Computer aided design CAD software — Autodesk AutoCAD software; Mentor Graphics PADS; SolidWorks CAD software; Xilinx Integrated Software Environment ISE

Development environment software — Assembler; C; National Instruments LabVIEW; Very high-speed integrated circuit VHSIC hardware description language VHDL

Object or component oriented development software — C++; Microsoft Visual Basic.NET; Microsoft Visual C# .NET

Operating system software — Hewlett-Packard HP OpenVMS; Real time operating system RTOS software

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.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

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.

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.

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

Skills

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

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

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

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

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.

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

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Operation Monitoring — Watching gauges, dials, or other indicators to make sure the machine is working properly.

An electronics engineer is expected to have an excellent knowledge of electronic devices and RF, analogue, digital and especially CMOS design. This includes electrical fundamentals like signal integrity and power integrity. “Specifically, expertise in VLSI, VHDL, FPGA and ASIC design, signal processing, control systems, industrial manufacturing systems, power transmission, simulation and verification techniques is required,” says Neeraj Varma, country manager-sales, Xilinx, India, Australia and New Zealand.

In terms of languages, one must be familiar with HDL (Verilog or VHDL), C and C++. Other skills that an electronics engineer must seek to possess are domain knowledge of microprocessors, control systems, embedded systems, and circuit and device testing.

Abilities

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Mathematical Reasoning — The ability to choose the right mathematical methods or formulas to solve a problem.

Near Vision — The ability to see details at close range (within a few feet of the observer).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment — Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are

to be fabricated, constructed, assembled, modified, maintained, or used.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Scheduling Work and Activities — Scheduling events, programs, and activities, as well as the work of others.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

What should you do prior to THE INTERVIEW?

Here we take you through five boosters for your career.

Tip #1: Pay attention to basics

It may not sound important, but most of the interviewers will start with active and passive components, building blocks of electronics systems and nonetheless faultfinding techniques. "A strong foundation of the basics of electronics is must Strong fundamentals of electronics will help you to understand complex topics that you may get exposed to after joining the industry.

Tip #2: Get trained to have an extra edge

If

Electronics has many branches today, such as VLSI, DSP, communications, power electronics and embedded systems. "The industry may assume that the student has been exposed to at least one course in these branches. While the industry may be willing to provide job-specific training, the student is expected to have the technical know-how required to absorb the training. For example, for training in VLSI, the student is expected to know about MOS transistor operation, CMOS circuits, logic gates and flip-flops, operational amplifiers, feedback amplifiers, poles and zeroes.

system-level design using off-the-shelf ICs is a major gap-area today. In digital and analogue design lab classes, students use simple ICs such as gates and op-amps. They may

later do a lab on microprocessor/microcontroller/DSP/C programming. Here learning could be improved in two ways:

1. The lab exercises in these classes are often 'canned'— there are ready-made kits with standard set of experiments that the students carry out in a routine fashion. Also, due to large team sizes, all students may not get the required exposure to equipment. However, with falling costs of electronics, students may be able to set up their own little lab in their hostel room. Availability of public-domain software and low-cost computing platforms has helped the students significantly.

2. There is no class where the learning from the courses in digital, analogue, processor and programming are brought together. This may happen in a project for some students.

India produces a large number of electronics and computer science graduate engineers every year. So while there is no dearth of manpower, the challenge is finding 'design-aware' engineers who are trained specifically in VLSI design and can ramp up quickly."

"With the surge in high-tech design projects coming to India in areas such as telecom, automotive, aerospace and industrial automation, the industry workforce has been exposed to very high levels of product design, development, testing and validation phases over the last decade or so. With more and more such projects becoming a norm in India, the industry requires talent with quality and specialised skill sets. The demand for electronics design engineers having product, domain and software tools expertise is high,"