



Road Map to become EMBEDDED ENGINEER

1 Technical Skills - HARDWARE

Electronics

- 1.3 Electronic Fundamentals
- 1.3 Principle of Electric circuit
- 1.3 Digital Design
- 1.3 Computer Architecture
- 1.3 Basic Math

Using Test Equipment

- 1.3 Multimeter
- 1.3 Logic / Protocol Analyzer
- 1.3 Oscilloscope

Prototype skills

- 1.3 Breadboard
- 1.3 Hardware Design
- 1.3 PCB Design & ElectroMagneticCompatability (EMC)
- 1.3 Soldering / Rework

3 Hardware + Software

Interfaces & Protocols

Basic

- 1.3 UART
- 1.3 I2C
- 1.3 SPI

Wireless

- 1.3 Bluetooth
- 1.3 WiFi
- Lora
- Zigbee

Automotive

- 1.3 CAN
- LIN

High Speed

- Ethernet
- USB

Industrial

- Modbus
- MQTT
- CoAP

Network

- TCP/IP
- UDP

Cellular

- NB-IoT

MCU

- 1.3 GPIO
- 1.3 ADC / DAC
- 1.3 Timers / Counters
- 1.3 PWM
- 1.3 WatchDog
- 1.3 Interrupts
- 1.3 DMA
- 1.3 Clock Management
- Bootloader
- Power Management

IoT

- AWS
- AZURE
- GOOGLE CLOUD
- Things speak

Embedded AI

- Raspberry PI
- Jetson Nano/Arduini
- PYNQ

Memory Technologies & File Systems

Hardware Simulation / Emulation

2 Technical Skills - SOFTWARE

Programming

- 1.3 C
- C++
- Python
- VHDL
- VeriLog

Programming Fundamentals

- 1.3 Data Structures
- 1.3 State Machines
- 1.3 Design Patterns
- 1.3 Memory Management

PCB Design

- 1.3 Orcad/Allegro
- Altium

Operating System

Embedded Linux

- Linux kernel
- Device Drivers

Real-time OS

- 1.3 RTOS Basics
- Free RTOS
- Zephyr

Build System

- 1.3 Compilers / GCC
- 1.3 Make / CMake
- Bash Scripting

Debugging

- 1.3 Jtag
- 1.3 Serial Wire Debug (SWD)
- 1.3 Gnu DeBugger (GDB)

Version Control

- 1.3 Git

Testing

- 1.3 TDD & Unit Testing
- CI/CD Pipeline
- SIL/HIL Testing

IDE

- 1.3 Keil MDK & µVision
- 1.3 STM32CubeIDE
- IAR Embedded Workbench
- Microchip Studio for AVR® and SAM Devices
- MPLAB® X IDE
- MCUXpresso IDE

4 Soft Skills

Critical Thinking

Ability to critically evaluate data and analytical outcomes

Communication Skills

Proficiency in communicating complex data insights to non-technical stakeholders.

Project Management

Skills in managing projects, including time management and organizational abilities.

Team Collaboration

Ability to work effectively in a team and collaborate with other departments.

Resume Buidling

Linkedin Mastery

5 Continuous Learning

Stay Updated: Keep abreast of the latest trends, tools, Hardwares, and technologies in Embedded Systems

Online Courses and Certifications: Engage in advanced courses and obtain certifications in Embedded & IoT related fields.