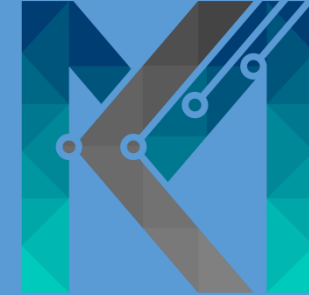


Embedded C & RTOS

Course Syllabus



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India's Leading Embedded Systems
Trainer & Real-time Embedded Expert



Course Objectives

- To get In-depth knowledge on Embedded C from the scratch.
- To gain hands-on experience with STM32 ARM Cortex board, which enables one to work with any hardware in future.
- Hands-on experience with protocols like I2C, SPI and UART.

Hardware Requirements

- Kernel Masters has designed and developed Industrial Hardware boards in collaboration with Embedded Core Companies.
- These Hardware boards will be used as part of the course for real-time project. Students need to purchase the board at the time of project.
- Total estimated cost of hardware kit for Embedded C project will be approximately Rs. 10,000/-.
- The kit comes with below components:
 - STMicroelectronics based Raayan Mini Board (For Embedded C and RTOS)
 - ST Link V2 Debugger
 - ESP32 Wi-Fi Module
 - USB TO UART TTL 5V 3.3V CH340G module

ARM Cortex M4

- ARM Architecture
- ARM Processor Modes
- ARM CPU Registers
- ARM Assembly Language
- System Tick Timer
- NVIC

Embedded Software

- Embedded C vs General C
- Bit-wise Operators
- Embedded C Programming
- Startup-Code
- Embedded C Hello world program.

Embedded Hardware

- Raayan mini board specifications
- STM32F4 Controller Specifications
- STM32F4 Memory mapping
- STM32F4 Interrupt Vector table

Development Environment

- Install Keil Software
- Install STM32 Board support packages
- ST Link V2 Debugger Drivers
- HAL drivers using ST Cube

STM32 Interfaces

- Timers
- Interrupt Controller
- PWM
- **GPIO Zone:**
 - LED, Switches, LCD
- **ADC Zone:**
 - LM35 Sensor

STM32 Communication Protocols

- **UART Zone:**
 - Wi-Fi, Bluetooth, GPS
- **I2C Zone:**
 - RTC, EEPROM, ADXL345
- **SPI Zone:**
 - TFT LCD, SD card
- **CAN Zone:**
 - IoT Node

Real Time Operating System

- Introduction to RTOS
- RTOS Internals & Real time scheduling
- Thread Management
- Priority Scheduler
- Application programming on RTOS
- FREE RTOS Porting on Raayan mini
- Building RTOS for Target systems using ST Cube Software

Industrial Embedded IoT Projects

- Smart Weather Monitoring System
- Smart Tracking System
- Smart Attendance System
- Smart Data Logger
- Smart Gateway
- Smart Grid
- Smart Health Monition System
- Smart Hand Held Terminal
- Smart Home Automation



Electronics Graduate Career Goal



Software Engineer

Embedded Software Engineer

Service Based Companies
 tcs Infosys accenture Cognizant


Semiconductor companies
 Qualcomm intel ST BOSCH

Job Designation
 Software Engineer

Job Designation
 Firmware Engineer,
 System Engineer, R&D Engineer

Salary
 Entry Level avg: 3.4 CTC
 Exp. Level Avg: No.of Years exp * 2

Salary
 Entry Level avg: 3.4 CTC
 Exp. Level Avg: No.of Years exp * 4

Job Satisfaction


Job Satisfaction


After 2+ Years of Exp

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