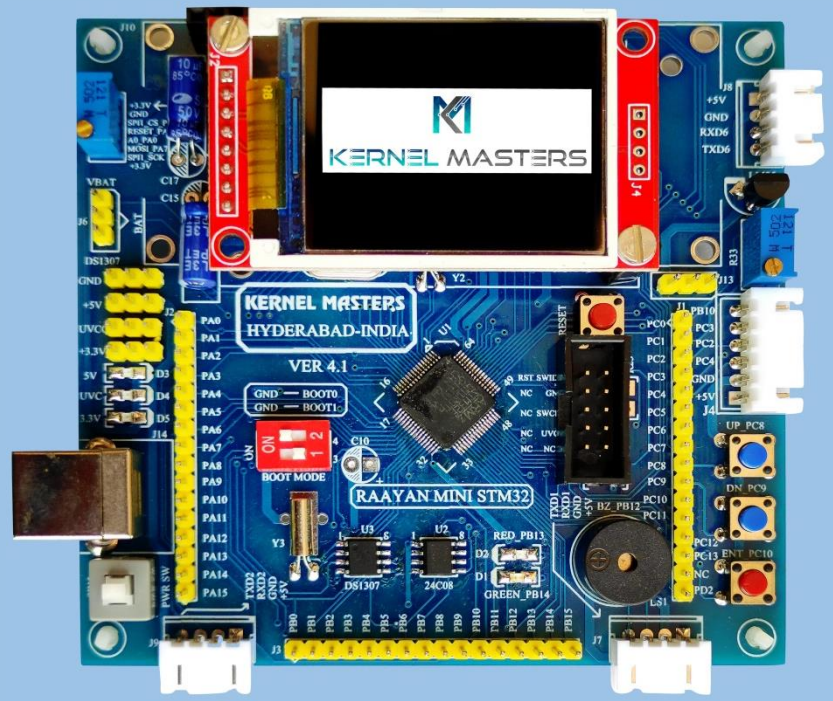

Embedded C, Embedded AI & RTOS

Course Syllabus

By Mr. Kishore Kumar Boddu

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

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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.

Embedded C, Embedded AI & RTOS Course

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

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Embedded C, Embedded AI & RTOS Course

Part 1: Embedded C/ Firmware /Baremetal Programming

Part2: Embedded AI & RTOS

Part3: Embedded C Projects

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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.

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Embedded C, Embedded AI & RTOS Course Syllabus

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

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Embedded C, Embedded AI & RTOS Course Syllabus

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

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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

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Electronics Graduate Career Goal

Software Engineer

Service Based Companies

tcs Infosys accenture Cognizant

Job Designation

Software Engineer

Salary

Entry Level avg: 3.4 CTC

Exp. Level Avg: No.of Years exp * 2

Job Satisfaction

After 2+ Years of Exp

Join Working Professional training at **Kernel Masters**

Gain 3+ years of Real-time Experience

Embedded Software Engineer

Semiconductor companies

Qualcomm intel BOSCH

Job Designation

Firmware Engineer,
System Engineer, R&D Engineer

Salary

Entry Level avg: 3.4 CTC

Exp. Level Avg: No.of Years exp * 4

Job Satisfaction

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