

By **Mr. Kishore Kumar Boddu** India's Leading Embedded Systems Trainer & Real-time Embedded Expert.



INDIA's One & Only Industrial Embedded Systems Institute



"Certified Industrial Embedded Systems Software Developer"

Training course with placements

About the Founder:

Industrial Experience:

Mr. Kishore Kumar has around 20+ years of embedded systems design, software development, system integration, validation on Qualcomm/Intel/Ti chipset based on Linux, Android, Tizen and IoT software platform in areas like Consumer Electronics, Tele Communications, Industrial & Automation domains. Having started his career as a Firmware Engineer, in a startup company called ICSA India Private Limited, he has experience in development of products like Energy Meters, RTU & SCADA. He further gained experience in Device Driver & Embedded Linux Development in Visiontek, with products like Point of Sale & Handheld Terminals. Later he worked as a Core BSP Developer, Android stability and various device drivers at Qualcomm & SAMSUNG.



By Mr. Kishore Kumar Boddu India's Leading Embedded Systems Trainer & Real-time Embedded Expert.

As founder of **KERNEL MASTERS**:

After gaining vast experience as a developer in the real-time industry, **Mr.Kishore Kumar** started sensing the lack of quality in the engineers he was recruiting for his teams. The lack of quality was from their education. They were not only lacking the skills required by the industry, some times they were not having proper programming skills, and even basic electronic concepts which were taught in Engineering studies. Inorder to provide better quality Engineers to the embedded industry, Mr.Kishore Kumar has started **KERNEL MASTERS**, with the sole motive of providing training that matches Industry requirements.

Teaching Experience:

Mr.Kishore Kumar works as the main Instructor in Embedded subjects and handles Embedded C programming, Linux System Programming, Device Drivers, Embedded Linux & Real-time projects guidance. Under his guidance, so far around 600 students, both experienced & freshers got benifited in their careers in embedded Field. The projects done by students under Mr.Kishore Kumar are at par with the Embedded Products under development in the Industry right now. He keeps updating the course content and the projects based on latest developments happening in the field. Being a real-time expert himself, he is always in a learning mode to upgrade himself to match the current market, he believes only then he will be able to help his students to face the challenges coming up in their work.

KERNEL MASTERS

Founders Message:

Why Embedded Systems?

Embedded Systems is a core electronics field where you get to work on Innovative products. This is where we get to see our work being used in the real world by real people. We can see our creations come to life only through Embedded Systems.

There is a lot of scope for Embedded Systems in almost every field nowadays, Consumer Electronics to Robotics, Agriculture to Military Air Crafts. With such huge scope, you can imagine the demand for a skilled Embedded Developers. The requirement is already huge with very limited skilled resources actually available. The shortage is due to the lack of awareness about this field as almost all of us have only grownup dreaming about Software Industry.

Believe us, Embedded Industry provides better opportunities and even better Salaries and growth than the Software Industry. To learn and succeed in this field all you need is Passion and commitment towards Embedded Systems and a GURU who will teach you and groom you to be a real-time embedded expert. The right GURU is the one who is always ready to learn and increase his knowledge and is willing to share his knowledge with his students.

Why should you choose KERNEL MASTERS to be your GURU?

KERNEL MASTERS is found by Mr.Kishore Kumar who has 14+ years of real-time Industry experience and is still connected to the Industry through his own start up Product Development Company, **Raayan Systems Pvt. Ltd.**

KERNEL MASTERS offers 6 months training on Embedded Systems which also covers the basic essentials every student should know before learning Embedded Systems. **So students with zero knowledge may join the course.**

KERNEL MASTERS does not hire any instructors, the founder Mr.Kishore Kumar himself is the instructor. So you will have **full-time dedicated staff** to help you out with your learning.

C Programming is the essential skillset required for Embedded Career. It is taught by Ms. Madhuri, who is also a dedicated Instructor for Kernel Masters, with 10+ years of real-time experience as a Software Engineer.

Ms.Madhuri also the co-Founder of **KERNEL MASTERS**, takes care of the placements. She takes **personal effort to place each and every student in suitable companies.**

At **KERNEL MASTERS** we provide **Hardware LAB** with Industrial Hardware Boards for Handson experience. The boards used are the latest architecture currently preferred in the Industry for product development.

KERNEL MASTERS has created their **own Development boards** using the latest hardware boards with provision for various peripherals and protocol implementation.

KERNEL MASTERS provides real-time project based training. We are the **one and only Industrial Embedded Systems Training Institute** in India.

The class room strength is limited. So there is more focus on each student. We observe their attendance, LAB assignments, performance and also give counselling if required.

KERNEL MASTERS students are Industry ready, and are most preferred by the hiring companies as we provide more quality in less quantity.

Placement opportunities start from 4th month onwards and will continue until the student is placed. The placement percentage per every batch is almost above 80%.



Founders Message:

What is Industrial Embedded Systems?

Most of the institutes, which claim to be Embedded Training institutes, provide training on Educational boards like Arduino and Raspberry Pi.

Whereas the actual Industry never uses these educational boards for real product development. Because of this difference, there will be a huge GAP between the candidates knowledge and the Industry requirement.

How to fill the GAP?

The educational boards like Arduino and Raspberry Pi etc come with readymade API. The developer need not dwell into the hardware inorder to work with it. They can simply use the API and get the work done. The efforts are less, so are the results limited.

Whereas the real-time products cannot be developed with in the limitations of the ready-made boards. They need hardware with more features. So they use **ARM Cortex boards like Beagle Bone Black**, **STM 32**, **TI Launchpad** etc which require bare metal programming. Student needs to understand the hardware completely and should know how to interface it with the required peripherals, how to do the communication etc without any ready-made code, which needs a lot of research.

KERNEL MASTERS fills this GAP by providing the Industrial hardware boards for training, where the student gets to learn everything from scratch, which helps the companies to deploy the students to the core parts of their projects without any extra training.

Companies are not hesitating to hire freshers and deploy them to important projects because of this advanced knowledge.

KERNEL MASTERS Admission Process

- Admissions through ALL India Entrance Test.
- No fees for admission test.
- * Apart from test score and qualification the eligibility criteria for admission also includes:
- * Passion and commitment towards Embedded Systems.
- Apply online at www.kernelmasters.org
- Course duration: 6 months

Syllabus for admission test:

C Programming, Digital Logic, Micro Controllers, Computer Organization,

Operating Systems, Aptitude & Reasoning.

Training Process

- 6- days a week. Theory 2 to 2.5 hours and practical 3 to 3.5 hours.
- There is no limit on lab hours if the student is interested to work
- Daily assignments for lab practice.
- * Theoretical and practical assessments for every topic.
- Mock Interviews & personal counselling.
- Monthly performance grading.
- * Interview oriented teaching in classroom.
- · Real-time projects
- Placement assistance only in Embedded companies, no other field.



Detailed Syllabus

Part1: Programming Concepts

Objective:

Mainly focuses on programming concepts on Linux Platform.

Module 1 covers Linux Basics to create awareness of Linux Platform for the beginners. **Module 2** completely concentrates on improving the programming skills and logical abilities in solving a problem. Those with absolutely no programming knowledge can start building the programs and go to the expert level in this module.

Module 1: Linux Basics

- . How Linux built
- Linux History
- Linux Kernel Architecture
- Linux Licence
- Linux Kernel Features
- Linux Commands
- Text Editors

- Shells, bash, and the Command Line
- Essential Command Line Tools
- Users and Groups
- Files and Filesystems
- Filesystem Layout
- Linux Filesystems

Module 2: Programming

'C' Programming Basics

- Writing, Compiling, and debugging C Programs
- Basic C Language Components
- Variables and Data Types
- Operators & expressions
- Conditional Statements & loops
- Memory Layout of C program.
- Storage Classes
- Stack Frame
- Functions
- Arrays
- Strings
- Pointers
- Pre-processor Directives

'C' Programming Advanced

- Pointer arithmetic
- Advanced pointers
- Strings and arrays with pointers
- Function pointers
- Array pointers
- Command Line Arguments
- Recursive Functions
- Dynamic Memory Allocation
- Structures, Unions, enumerations
 & Bit fields
- File Handling

Data Structures

- Introduction to DS
- Types of Data Structures
- Stacks
- Queues
- Single Linked Lists
- Double Linked Lists

Shell Programming

- Shell Scripts
- Variables, Parameters
- Conditions
- Loops
- Functions
- Shell Debugging

Python Programming

- Python Overview
- Basic Syntax
- Basic Operators
- Control Statements
- Python modules
- Strings File I/O
- Python Exceptions
- Python Example: Serial Port



Detailed Syllabus

Part 2: Embedded C & Firmware Development

Objective:

Mainly focuses on Embedded C & RTOS Programming on ARM Coretx M4 with Industrial Projects.

Module 3 brushes up the concepts studied during academics, which are pre-requisites to learn embedded C programming.

Module 4 covers the Industrial Embedded Systems with real-time project. In this module student completely becomes a Pro in Embedded Development and is ready for embedded projects using any kind hardware. We have a well-built Hardware LAB set up which can be accessed by each student one-on-one. Enthusiastic students can explore multiple projects and implement their own ideas too.

Module3: Embedded Systems Essentials – Academic Level

Electronics Basics

- Resistors
- VoltageCurrent

Digital Electronics

- Number Systems
- Logic Gates
- Combinational Circuits
- Sequential Circuits
- Applications of Digital circuits

Embedded Systems Terminology

- Microprocessor vs Microcontroller
- Types of Architectures
- Embedded Systems
 Development Environment
- Simple Embedded vs Complex Embedded Systems

Computer Organization

- Introduction to CO
- Memory Organization
- Memory Mapping
- I/O Organization

8085/8086 Microprocessor

- 8085 Specifications
- 8085 Functional Block Diagram
- 8085 Instruction Set
- 8085 Assembly Language Programming (ALP)
- 8086 Memory Segmentation

Module4: Industrial Embedded Systems

ARM Cortex M4 Architecture

- Introduction to ARM
- ARM Processor modes
- ARM Registers
- ARM Cortex M4 Assembly Language
- System Tick Timer
- NVIC

Embedded Software

- . General 'C ' vs Embedded 'C'
- Bitwise operators
- Embedded C Programming
- Start-up Code
- Keil
- Code Composer Studio

Microcontroller Interfacings:

- GPIO: LED, Switches, LCD, DHT11
- UART: Bluetooth, Wi-Fi, Finger Print Sensor, GSM, GPS, MP3 Player, Zigbee
- I2C: RTC, EEPROM, ADL345
- SPI: OLED, SDCARD, A/D
- . CAN: OBD II protocol
- PWM, WDT, Timers/Counter
- ADC.DAC
- Interrupt Programming

Embedded Hardware

- KERNEL MASTERS Firmware
- Development Boards
- TM4C123G Microcontroller Architecture.
- STM32 Microcontroller
- CC3200 Wi-Fi Microcontroller

RTOS

- Introduction to RTOS
- RTOS Internals & Real time Scheduling
- Thread management
- Time Management
- Thread Sleeping
- Deadlocks
- · Priority Scheduler
- Application programming on RTOS
- Free RTOS Porting on TM4C
- Building RTOS for Target Systems

Industrial Embedded IoT Projects

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



KERNEL MASTERS Development Boards

Kernel Masters Development boards were developed by Kernel Masters in collaboration with Raayan Systems Private Limited.

KERNEL MASTERS TM4C123 Firmware Development Board



Board Specifications

- ARM Cortex M4
- TM4C123 Controller
- Serial comm Protocols: UART, I2C, RS485, CAN, SPI & USB
- ADC Controller
- 16 X 2 monochrome LCD display
- · 3G GSM Module
- · Wireless Protocols: Zigbee, BT, Wi-Fi
- · RTC, EEPROM
- 40 GPIO PINS

RAAYAN SYSTEMS STM32 MICRO Board



Board Specifications

- ARM Cortex M0/M1/M2/M3/M4
- STM32 Controller
- Serial comm Protocols: UART, I2C, RS485, CAN, SPI & USB
- ADC Controller
- 16 X 2 monochrome LCD display
- 3G GSM Module
- Wireless Protocols: Zigbee, BT, Wi-Fi
- RTC, EEPROM
- 40 GPIO PINS

KERNEL MASTERS Embedded Linux Development Board



Board Specifications

- ARM Cortex A8
- AM335X Processor
- Serial comm Protocols: UART, I2C, RS485, CAN, SPI & USB
- ADC Controller
- 16 X 2 monochrome LCD display
- Wireless Protocols: Zigbee, BT, Wi-Fi
- RTC. EEPROM
- 128 GPIO PINS

KERNEL MASTERS Android Development Board



Board Specifications

- AM335x Controller
- · ARM Cortex A8 Processor
- Display: 7 Inch LCD, 1024*600 Pixel
- Touch: Five Point Capacitive touch
- Audio: 1 Audio out,1 Mic In
- RS232: 2 Channel

- RS485: 2 Channel
- CAN: 1 Channel
- Buzzer: 1
- User Key: 5
- · User LED: 2
- Three-Axis Digital Accelerometer



Detailed Syllabus

Part3: Embedded Linux Device Driver Development [Advanced Embedded Systems]

Objective:

Focuses on Advanced Embedded Systems concepts required to work on Linux Device Drivers projects.

Module 5 teaches how to interact with Linux Kernel and covers Operating System concepts and Linux Internals.

Module 6 covers Linux Device Drivers explores character device driver framework.

Module 7 Open Source Development environment for the Embedded Linux project.

Module 8 teaches end to end solutions in IoT Architecture.

Module 5: Linux System Programming

Linux Development Environment (GNU Toolchain)

- GCC
 GNU Build System
- GDB (GNU Debugger)
- GNU Makefile GNU binutils

Operating Systems Concepts

- Types of Kernel
- OS Operations
- Linux Kernel Architecture
- Scheduler Algorithms
- IPC & Synchronization

File Management

- * File System Layout
- Super Block & inode
- System Call vs Library Calls
- System Call Sequence
- File descriptor table
- File related System Calls
- File Control Operations
- File Locking

Process Management

- Mode of Execution
- Address Space
- Context SwitchingProcess Structure & States
- Scheduling & Priority
- Process Creation & Exec
- fork()/exec() calls
- SignalsThreads

Memory Management

- Virtual Memory
- Paging & Swapping
- Memory MappingDemand Paging

Synchronization

- Producer Consumer Problem
- Thread Synchronization
- Process Synchronization
- POSIX Semaphore & Mutex

Inter-Process communication

- PipesSockets
- System V Shared Memory
- System B Message Queues

Network Programming

- Network Topology
- * OSI vs TCP/IP Layer
- Data Encapsulation TCP/IP Model.
- TCP/IP Protocol Suit
- IP address
 Subnet Mask
- Routing
- Ethernet Frame Format
- Wire shark Tool
- Socket Programming

Linux Debugging Techniques

- GDB, gdb server * Strace
- Valgrind */proc & /sys

Module 6: Linux Device Drivers

Introduction to Linux Kernel

- Two Roles of Kernel.
- Kernel Programming
- Linux Source tree Overview
- /proc and /sys virtual file system.
- Configuring, Compiling and
- Booting the Linux Kernel.

Introduction to Device Drivers

- What is Device Driver?
- Types of Device Drivers
- Classes of Device Drivers
- System Programming vs Device
- Driver Programming
- The Role of the Device Driver
- Add a new System call in x86 and ARM

Module Programming

- What is a Kernel Module?
- User mode vs Kernel mode
- Our First Linux Driver
- Module Parameters
- Module Dependency.

Module 7: Open Source Development Environment

SDLC Process

Open Source Development

- Open Source Software
- Why Use Open Source Software?
- OSS Licensing and Legal Issues

Source Code Version Control

- Introduction to GIT
 Git Installation
- Git and Revision Control Systems
- Git Concepts and Architecture
- Useful git commands.
- Contributing patches.
- Managing Files and the Index
- Commits
 Diffs
- Branches
 Merges
- Using Patches
- Managing Local and Remote Repositories

Bug Tracking Tools

Bugzilla

Source Code Browsing Tools

- cscope tag
- ctag

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Module 8: Internet Of Things (IoT)

IoT Architecture

- End User
- Physical
- IoT Gateway
- CloudDatabase server
 IoT Applications
- mvsal
- CoAP

Networking

6LoWPAN

IoT Challenges

MQTT Protocol

Wireless Communications

- Wi-Fi
- ZigBee
- Bluetooth

Module 9: KERNEL MASTERS Placement Assistance Program (KMPAP)

- Profile Preparation
- Interview oriented Course revision
- Regular assessments
- On Campus / Off-Campus Interview support
- Individual interview guidance
- C-Vital (C language practice)

Presentation Skills

- Project Presentation
 Seminars
- How to present the project in an interview
- Team Interactions and motivational sessions
- Technical mock interviews

Module 9 Helps students build up own profile and improve presentation skills to make them interview ready.

This is the parallel program conducted throughout the course. Placement assistance program for any student completes when they are successfully placed.

Training program for embedded career start-up

The above course structure is designed keeping a fresher's mind set and prior knowledge in mind, to give the required push to the candidate to enter the semiconductor companies.

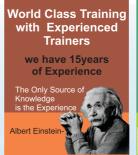
Upskill for career growth

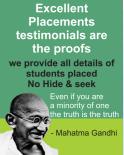
We also provide the "Embedded Linux Design & Development" course for working professionals. Candidates, who complete our fresher course, may also join any of the following courses to up step their knowledge and grow further in Embedded Linux domain.

- Embedded Linux with Beagle Bone Black
- Yocto Projects
- Linux I2C Drivers
- Embedded Android











KERNEL MASTERS Testimonials



S Poojitha

Circuit Sutra, Bangalore with a package of 7 lacs per annum

The guidance from both **Madhuri** mam and **Kishore** sir helped me a lot in getting through CIRCUIT SUTRA interview with the best package so far at the institute. This is the good place where you get the hands on experience in Embedded Systems. And the only thing one has to do is to work hard and cooperate with the faculty.

Aslam Basha Mohammad Team F1 Networks(DLink Corporation)

At first after seeing the course syllabus, I doubted that whether this syllabus will be covered or not within 6 months. But finally all the syllabus will be covered very beautifully that you will be wondering that how the syllabus got covered that too with clear explanation





SHAIK ZUBAIR AHMED

B.E,2018,E.C.E,from MJCET TEAMF1NETWORKS,Hyderabad

KERNEL MASTERS is the gateway to the embedded world. In **KERNEL MASTERS** the course syllabus is designed in such a way that student gets the practical knowledge of what industry needs or required. In Every module there are lots of assignments /lab tests/written tests whose standard are equivalent to industry requirement. In every module we get mini-projects which are similar to real time project

Sneha Dhar

M.Tech(ESD) 2016 passed out from SUIIT with 90%
QolsysSoftwares India Pvt Ltd, Hyderabad
All the concepts were neatly explained and doubts were cleared on time. A lot of
hands-on was done during the class to get a clear picture of why we need to do this.

All the concepts were neatly explained and doubts were cleared on time. A lot of hands-on was done during the class to get a clear picture of why we need to do this. **Kishore Sir** and **Madhuri Mam** were awesome to explain each concept in the easiest way. Their team is like best in the world solving our query within no time.





Chandrakanth Reddy Sanduri

B.Tech,ECE,2018 from St.Martin's Engineering College
Company: Satyam Ventures engineering services pyt ltd
The institute is located in a serene environment. The main reason why I choose KERNEL
MASTERS is their course curriculum and the contents in it. This course consists of different
modules which were not present in any other institutes as far as I saw. They provide handson experience on the industrial boards such as TM4C123GH6PM, STM32, Android
development board, Embedded Linux development board (Beagle Bone black).



B.Tech, EEE, 2018 from Nalanda Institute of Technology, Bhubaneswar with 7.37 CGPA Kishore sir gives guidance, not like a teacher, but like a Guardian. It is impossible to find such a Guardian in any other training institute





Radha Krishna Vangaveeti

Being a Mechanical Engineering graduate, I was looking to pivot my career into the field of Embedded Systems. **KERNEL MASTERS** is a great Institute that has provided me the platform to achieve my goal as everyone gets a chance here, irrespective of your branch of studies. Curriculum was the best which enabled me to grasp everything without worrying about my prior knowledge in this field as they teach everything from basics. I for sure recommend this Institute

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Photo Gallary



HIRING COMPANIES













































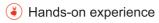




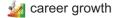




KERNEL MASTERS Features:





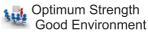


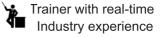












This booklet has been printed to create awareness among engineering students on Embedded Systems field and how to enter the industry by gaining the proper skillset and hands-on experience. Please share this with your friends, juniors and acquaintances so that they can also benefit.

Address: We have only one branch. LIG:420, 2nd Floor, 7th Phase, KPHB Colony, Hyderabad - 500 085. Phone: 9949062828, 9963111083 | Mail ID: info@kernelmasters.org | Website: www.kernelmasters.org

