POWERSOFT SYSTEMS
EMBEDDED CONTROL SOLUTIONS

Internship in Embedded Systems

Introduction:

The internship at Powersoft Systems comprises the following experiential components:

1. Lectures on Embedded Systems Design (8-bit PIC, Arduino Microcontrollers, 32 bit ARM-M0Cortex controllers), Communication Protocols for Automotive Systems
2. Labs on Microchip PIC controllers, ARM Controllers
3. Hardware build demonstrating interfaces in communication such as CAN, SPI, UART, Motor control drivers and actuators
4. Test case and Test procedure development with CAN-J1939, IOT-AWS type of platforms
5. Power converter interfaces – Build, Test
6. Develop competency in the use of Diagnostic tools such as Oscilloscopes, CAN tools, Serial Port Monitors
7. Product Development Basics, Intellectual Property Creation
8. Participation in Joint projects with Industrial Partner (GSV Microtech Pvt. Ltd)
9. Courses in Embedded Systems for PIC Controllers, Embedded Systems for ARM Controllers, Hardware Schematics and PCB Design
10. Life membership in Powersoft group with access to alumni, job openings, technical information, network of engineers working in embedded, automotive and industrial domains

Embedded C for PIC Controllers

Course Content

1. PIC Architecture and EDS-16F87X system demo with C program
2. Introduction to embedded C
   Embedded C compiler, linker, Build projects, debugging C/ASM/HEX files
3. Data types and constants
   Data types, constants, variables, header file declaration, Signed/Unsigned arithmetic
   Labs: 8-bit, 16-bit Signed and Unsigned arithmetic
4. Flow Control
   Control Statements, if, if-else, while, do-while, for & switch-case
   Creating Delay using Statements, I/O Ports Key reading programs
   Labs: Switches and Matrix keypad interfaces
5. Functions
   Calling functions with/without arguments, Return mechanisms
   Labs: Display devices: LCD interfaces
6. Array, Pointers and structures
   Writing multiple messages using pointer and arrays, Structures in embedded C
   Labs: Writing messages in LCD using arrays and pointers
7. ADC, Timers and Interrupts
   Analog to Digital converter initialization and operations, Timers and counters functions, Interrupts
   Labs: Timer Overflow Interrupts, Real time event scheduling, ADC Programming
8. Capture/Compare/PWM Concepts
   PWM Generation Communication with PC RS 232 interface, Frequency measurement
   Labs: Generating PWM
9. Serial Communication
   Communication with PC RS 232 interface, UART, I2C, SPI, CAN
   Labs: Serial Communication using USART, CAN, SPI

Embedded System Design Using ARM M0-Cortex Controllers
Course Content
1. Introduction to ARM Architecture and Nuvoton-Numicro ARM-M0 Cortex family
2. Introduction to Keil-uVision tools, Compiling in assembly language and C language
3. Basics of assembly language using Thumb architecture of instructions
4. Assembly language programming examples, Debugging breakpoints, register views
5. Introduction to Cortex Microcontroller Software Interface Standard, Libraries
6. Programming in C language
7. Interface to LEDs, buzzer, seven segment display, LCD, switches, ADC, DAC,
8. UART, SPI interfaces
9. PWM generation, DC to DC Converter control, SPWM Inverter pulse generation
10. RTOS in ARM Controllers
11. Projects/ Products Using ARM Controllers
    Lab Components in all sections

Hardware Schematics and PCB Design
Course Content
1. Schematics, Part Library, Component creation, Parts Library
2. Common interfaces in Power Converters, user interfaces, communication peripherals
3. Netlist creation, Bill of Materials Preparation
4. PCB Part placement, Routing of tracks, Multilayer Design, Ground planes, Gerber generation
5. Designing for EMI/EMC

Course Director:
Dr. Ramani Kalpathi
Partner, The ARM Academy
Proprietor, Powersoft Systems

Education:
PhD in Electrical Engineering, Texas A&M University, College Station, USA
M.S in Electrical Engineering, IIT Madras
B.E in Electrical Engineering, B.M.S College, Bangalore University

Work Experience:
Senior Project Engineer, Dana Corporation, USA

Authored books on Microcontrollers, IEEE publications on Power Electronics and Motor Drives
Holds seven US patents in the areas of Motor Controls.

Powersoft Systems and The ARM Academy are involved in the following domains:
a. Training on Embedded Systems
b. Proof of Concept using microcontrollers
c. Remote Monitoring solutions, Instrumentation and IOT prototypes
d. Renewable energy monitoring systems, Data Analytics

Fees:	**Rs 35,400** (Rs 30,000 + 18% Tax)
Duration:	3 months (Full Time)
Email:	ramani.kalpathi@gmail.com
Phone:	94440-34160 (WhatsApp, SMS)

Internship can be started at any time throughout the year and may be full time or part time. Please discuss with us for convenient timings in case you are employed or would like to pursue the internship in short breaks.

<u>Bank Information</u>

Payments for internship may be made to the following account by direct transfer.

Name:	POWERSOFT SYSTEMS
Phone:	94440-34160 (Proprietor: Dr Ramani Kalpathi)
Bank Account:	ICICI Bank , Type of Account: CURRENT
IFSC:	ICIC0002696
Account No:	000905001886
Bank Address:	ICICI BANK
	NO.93, KUNDRATHUR MAIN ROAD
	PORUR,CHENNAI – 600116. TN