

Advance Embedded Systems

A Post Graduate Diploma Program offered by



For more details about the course, contact us

Zaib Technologies Pvt. Ltd.

Embedded System Consultancy, Development and Training

+91 9096234799, info@zaib-tech.com, www.zaib-tech.com

Head Office: 406, LandMark Centre, Op. City Pride, Pune Satara Road, Parvati, Pune 411009.

Introduction to Zaib Technologies Pvt. Ltd.:

Zaib Technologies Pvt. Ltd., with head office in Pune, India, is a leading Indian Embedded Systems company providing Technical Consultancy, Development and Training services across the globe. It is India's one of the best training and workshop company for Embedded Systems and Robotics.

It conducts various Summer Training programs, Industrial training programs, embedded systems and robotics workshops, advanced embedded systems courses in various cities of India like Pune, Chinchwad, Nasik, Jalgaon, Sholapur, Nagpur, Kolhapur, Aurangabad, Bhopal and Osmanabad etc.

The courses, training programs and workshop range from basic electronics to advanced embedded systems hence satisfying from hobby learners to Embedded Systems careers aspirants. Some of the sophisticated training programs provide 100% Job Guarantee in the field of Embedded Systems.

Learning Objectives:

The "Post Graduation Diploma program in Advance Embedded Systems" is a sophisticated course designed by Zaib Technologies Pvt. Ltd. in association with people from embedded systems industry and IIT alumnus.

It is a six months full time course and is executed in such a way that students get a chance to study, learn and design the systems in the lab for the first three months and then work on Live Industry Projects being implemented by Zaib Technologies Pvt. Ltd. and its partners in next three months.

This is a placement oriented course that aims at bridging the gap between industry and academics by providing students a platform to work on cutting edge technologies mostly with a good hands-on experience in the embedded lab.

It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.

The students will have the opportunity to develop various Embedded Systems from the ground up, starting with electronic components and data sheets, and progressing through construction of hardware and implementation of firmware. There are multiple such projects starting from a basic ones like LED based Games to quiet advanced ones like Oscilloscope.

As mentioned earlier, the students also get a chance to work on live industry projects for three months hence learning the industry aspect of the field. As this is a placement oriented course, students are trained with soft skills like Business Communication, Client Interaction, Team Building, Leadership skills etc.

The Zaib Technologies Pvt. Ltd. promises 100% Job Guarantee in Embedded Systems industry after completion of this course.

Why Embedded Systems?

- Embedded systems are involved in almost every facet of modern life. All modern luxury equipments like Digital Cameras, Mobile Phones, GPS Devices, Cars, Bikes, Televisions, DVD Players, Video Games, Pagers, PDAs, Answering Machines, Microwave Ovens, Network Routers, Fax Machines, Music Synthesizers, Planes, Spacecraft, and Boats are some of the examples of Embedded Systems.
- Late model cars may contain as many as 65 embedded microprocessors, controlling such tasks as antilock braking, climate control, engine control, audio system control, airbag deployment etc.
- Logic analyzers and digital storage oscilloscopes utilize embedded processors to support real-time operation.
- Even PCs, which are designed around powerful CPUs such as the Intel Pentium 4, contain embedded systems. Floppy and hard disk drives, CD-RW and DVD-ROM drives, and external peripherals such as printers, scanners, and other SCSI, USB, or IEEE 1394 devices all contain embedded processors.
- In a particular year, microprocessor manufacturers sold on the order of 100 million processors for use as computer CPUs. In comparison, during the same time frame, microprocessor manufacturers sold more than 3 billion embedded processors, primarily consisting of 32-bit, 16-bit, 8-bit, and 4-bit devices.
- The tremendous number of applications for embedded computing has given rise to high demand for engineers with experience in designing and implementing embedded systems.

Required Background:

The student enrolling for this course should have a basic knowledge of following:

- Microcontroller and microprocessor Architecture
- Assembly language Programming
- Microprocessor peripherals
- Digital Design
- C programming
- Electronics Design
- Computer Organization
- Compilers, Assemblers, Linkers, Operating Systems
- Analog Design

Tentative Syllabus:

- 1) Understanding Embedded Systems
 - a. Overview of Processors & Microcontrollers
 - b. Memory (RAM, ROM, EPROM, EEPROM, FLASH)
 - c. I/O Interfaces
 - d. Host & Target Development environment
 - e. Cross Compilers
 - f. Downloading Techniques

- 2) 8051 Microcontroller
 - a. Architecture
 - b. Addressing modes
 - c. Instruction Set
 - d. Assembly and C Language Programming

- 3) AVR Microcontroller
 - a. Architecture
 - b. Addressing modes
 - c. Instruction Set
 - d. C Language Programming

- 4) PIC Microcontroller
 - a. Architecture
 - b. Addressing modes
 - c. Instruction Set
 - d. C Language Programming

- 5) ARM Processors
 - a. Architecture
 - b. Addressing modes
 - c. Instruction Set
 - d. C Language Programming

- 6) 80386 Microprocessor
 - a. Architecture
 - b. Addressing modes
 - c. Instruction Set
 - d. C Language Programming
 - e. Overview of I/O Interfacing (8251, 8253/54, 8255 8257, 8259, 8279)

- 7) PCB Layout Design
 - a. Floor Planning and Placement
 - b. Routing Connections
 - c. Auto Routing
 - d. RF Design
 - e. High Speed Constraints
 - f. Design Verification
 - g. Generating Reports
 - h. Printing and Plotting the Design
 - i. Generating Manufacturing Files

8) Programming Environment

- a. Review of C Programming
- b. Data Structures
- c. Embedded Systems Design, Implementation and Testing
- d. Overview of Networking and Packet Switching Concepts
- e. OSI Reference Model and TCP/IP Protocol Suite
- f. LAN Protocol Suite
- g. Application Layer Protocols
- h. Embedded Network Protocols: Issues and Applications
- i. Security Issues in Embedded Systems
- j. Video and Audio Standards

9) Object Oriented Programming and Design

- a. C++
- b. Java
- c. Introduction to UML
- d. Software Development Life Cycle
- e. Project Management

10) Real Time Operating Systems

- a. Introduction to OS
- b. Process Management and Inter Process Communication
- c. Memory management
- d. I/O subsystem
- e. File System Organization
- f. POSIX Thread Programming
- g. Introduction to Real-Time / Embedded Operating Systems
- h. Real Time Scheduling
- i. Performance Metrics of RTOS
- j. Linux and RTLinux Internals
- k. Programming in Linux and RTLinux
- l. Configuring and Compiling RTLinux
- m. Overview of other RTOS / EOS

11) Embedded System Programming

- a. Embedded Systems Design Issues
- b. Challenges and Trends in Embedded Systems
- c. Assemblers, Compilers, Linkers, Loaders, Debuggers
- d. Profilers and Test Coverage Tools
- e. Utilities like make, ranlib, obj copy and obj dump
- f. Configuring and Building GNU Cross-Tool chain
- g. Building RTOS / EOS Image for Target Hardware
- h. Porting RTOS and Embedded Operating Systems
- i. Writing Time and Space Sensitive Programs
- j. Writing Device Drivers
- k. Interrupt Handling in C
- l. Combining C with Assembly
- m. Current events and emerging technologies.

12) Microcontroller Interfacings

- a. LEDs
- b. Switches
- c. DC Motor
- d. Stepper Motor
- e. Servo Motors
- f. Relay
- g. Real Time Clock
- h. ADC
- i. DAC
- j. Temperature Sensor
- k. Humidity Sensor
- l. Pressure Sensor
- m. IR Sensor
- n. Ultrasonic Sensor
- o. Accelerometer
- p. RF Modules
- q. Zigbee Modules
- r. Thumb Scanner
- s. I Button
- t. RF Card
- u. Serial Communication
- v. LCD
- w. Graphical LCD
- x. Color LCD
- y. DTMF
- z. GSM
- aa. GPS
- bb. Smart Card
- cc. RF ID
- dd. Touch Screen
- ee. Bluetooth

13) Digital Signal Processing

- a. Architecture of Digital Signal Processors
- b. Digital Signal Processor vs Conventional Processor
- c. Fixed Point and Floating Point Arithmetic
- d. Digital Signal Processing for Embedded Systems
- e. DSP-based Embedded Systems Design Process: Selecting Processors, ADC, DAC, DDC, DDS, Algorithms.

14) Embedded Communication, Network Programming

- a. Basics of computer network, Overview ISO OSI/IP layers
- b. Internet addresses, Address resolution problem & ARP implementation, RARP Implementation
- c. Internet protocol, Routing IP Datagram's through IP, Routing with IP addresses, ICMP Protocol
- d. Super net & Subnet extensions, UDP, TCP
- e. Overview on Boot p, DHCP, FTP, DNS, Telnet, NFS, SMTP, SNMP.
- f. Future of TCP/IP
- g. Sockets, Socket Addresses, Socket Data Structures, Elementary Socket System calls.
- h. Advanced Socket System Calls, Socket Implementation
- i. TCP, UDP Implementation Using Sockets

15) Wireless Embedded System Design

- a. Protocol Design and Validation
- b. Network Embedded Systems (Operating Systems and programming)
- c. Bluetooth and IrDA
- d. Wireless Sensor Networks and ZigBee
- e. Wireless LAN - IEEE 802.11
- f. RFID
- g. GSM and GPRS
- h. Ubiquitous Computing

16) Soft Skills

- a. Business Communication
- b. Written Communication
- c. Email Communication
- d. Client Interaction
- e. Team Building
- f. Leadership Skills

17) Technical Writing

Students Explore Project Hands On:**8051 Family Microcontroller:**

LED based Game
Digital Calendar
Line Follower Robot
Sound Recording and Playing
Home Automation
Street Light Controller

AVR Family Microcontroller:

Digital Thermometer and Controller
Line Follower Robot

PIC Family Microcontroller:

Digital Thermometer and Controller
Line Follower Robot

ARM Family Microcontroller:

Implementation of TCP/IP using ARM
Implementation of FAT using ARM
Implementation of Data Encryption Standard using ARM
Attendance Monitoring using Thumb Scanner and ARM
Library Management using Smart Card and ARM
Logic Analyzer based on ARM
Fuzzy Logic Washing Machine using ARM
Oscilloscope using ARM
Implementation of Chess using ARM and Touch Screen

TM

ZAIBTECH

Consultancy | Development | Training

What Students Get?

Certificate of Completion of the course
Placement Assistance (100% Job Guarantee)
Project Letter for the projects completed as part of the training
Sponsorship/JOB Offer letter (if selected)

Who Can Participate?

Freshers / Professionals holding B.E. with Electronics, Electronics and Telecommunication, Instrumentation, Computer, IT and should clear the entrance exam.

Fees:

Rs. 55,000 + Taxes

Payable in two installments.

Rs 20,000 at the time of registration.

Rest amount within six weeks of registration.

The Fees includes:

- 1) 3 Months Training and Lab Charges
- 2) 3 Months Participation in Live Industry Projects
- 3) Certification, Evaluation and Test Fees.

Who is the trainer?

Zaib Technologies Pvt. Ltd. selects all trainers carefully. All trainers are from industry with five to twenty years of industry experience on their respective fields.

How to enroll?

Call us today at 0091 9096234799 or drop an email at info@zaib-tech.com to get the details

Consultancy | Development | Training

Learning is not compulsory, neither is survival.