

COURSE CONTENT

Internship & Training in Basics of Embedded System: ITBE

Embedded System is the most demanding technology now days as every next seen device have its application.

Recommendation: Beneficial for students in starting phase with Embedded System, interested in Microcontroller based projects.

Prerequisite: General knowledge of electronic components & circuits with basics of “C” language.

Intoduction of Embedded System

Introduction

Component of Embedded systems

Hardware fundamentals

Basic Electronic

Digital Electronic

Introduction of Microcontroller

Brief introduction

INTEL, Philips, AVR, Microchip

The 8051 Architecture

Hardware Details

8051 Registers

Memory Organization

Port Organization

On Chip Peripherals

8051 Interrupts

Programming The 8051

Programming Languages

Programming Tools and Techniques

Addressing Modes

Introduction to Instruction Set

Arithmetic

Logical

Data transfer

Branching

Bit manipulation

Introduction of Timer/Counter

How does a timer works

How to make accurate delay using timer

List of learning modules

Theoretical aspect of each module

Practical implementation

PROJECT BASED TRAINING

Interfacing of Input devices

Interfacing Opto-Isolators

What is an optocoupler?

How they work

How to interface with microcontroller

Interfacing linear Keypad

What is the type of switches?

Their types & function

How to connect & read keypad with microcontroller

Timer Interrupts

What is a timer?

What is an interrupt?

How does 51 timer works

How to write code for timer

Counter Interrupts

How does it work?

What are the different modes of counter?

How to write code?

Interfacing of Output Devices

LED

Different types of LED.

How it works?

How LEDs will rotate?

How to connect with microcontroller?

What is sourcing & sinking?

Relays

What are the different types of Relay?

How it connect with microcontroller?

Seven Segment Display

What are the types of display?

Difference between Common Anode and Cathode

Driving circuits

Stepper motor

How a stepper motor works?

How to drive stepper motor?

DC Motor

How a dc motor works?

Motor driving IC

Piezo buzzer (Alarm unit)

How does a buzzer sound?

LCD (Liquid Crystal Display)

What is an LCD?

How to give commands to LCD?

How to interface LCD with Microcontroller?

Additional Interfaces

Concept of Real world interfacing devices like electrical home

Appliance/sensors activators, electromechanical devices

Embedded tools Used

Software tools

Assembler: 8051 IDE (Editor Assembler Simulator)

Intro to KEIL 'C' compiler

Hardware Tools

Programmer: In system programmer developed by Thinnk Ware

Takeaway resources after training:

- Takeaway Development board after the training for further project work
- A self compiled study material of Thinnkware of respective courses
- A CD of compiler in Embedded System

Internship & Training in Advanced Embedded System: ITAE

Embedded System is the most demanding technology now days as every next seen device have its application.

Recommendation: Beneficial for students having knowledge of some basic microcontrollers, interested in good Microcontroller based projects.

Prerequisite: knowledge of basic “C” language.

INTRODUCTION TO EMBEDDED SYSTEM

Introduction

Component of Embedded system

INTRODUCTION TO ROBOTICS DESIGN

What is Robots?

Robot Mechanism

Different types of robot (Mobile controlled Robot , Sound detector Robot, Distance measuring Robot,

Touch sensing Robot , Obstacle detecting robot , Micromouse , Swarm Robot and many more)

Robot Movements

MATLAB Controlled Robot

INTRODUCTION TO ATMEGA 32 MICROCONTROLLERS

Brief introduction

INTEL, Philips, AVR, Microchip

The AVR Architecture

Hardware Details

AVR Memory Organization

I/O Port Organization

On Chip Peripherals

INTRODUCTION TO SOFTWARE TOOL CHAIN

Programming of ATMEGA 32

Introduction to WINAVR & PONYPROG Software

Programming using Embedded C

Tips to enhance programming skills

Interfacing of Robotics sensors

Sound sensor

Obstacle detector sensor

Distance measuring sensor

Touch Sensor

INTERFACING OF OUTPUT DEVICES

LEDs

Different types of LEDs.

How it works?
How LEDs will glow in sequence?
Interfacing of LED with microcontroller
Sourcing & sinking
Seven Segment Display
What are the types of displays?
Difference between Common Anode and Common Cathode
Interfacing of segment with Microcontroller
LCD (Liquid Crystal Display)
What is an LCD?
How to give commands to LCD?
Interfacing of LCD with Microcontroller
DC MOTOR
How a dc motor works?
Interfacing of DC motor with Microcontroller
Motor driving ICs
STEPPER MOTOR
How a stepper motor works?
Interfacing of Stepper Motor with Microcontroller
Motor Driving ICs

INTERFACING OF INPUT DEVICES

SWITCH
Different types of switches?
Their types & functions
Interfacing of switch with microcontroller
KEYPAD
Designing of linear and Matrix Keypad
Interfacing of keypads

ADVANCE AVR TOPICS

INTERRUPT
ATMEGA 32 Interrupts
External Interrupts
TIMER/COUNTER
Introduction of Timer/Counter
How does a timer works
How to make accurate delay using timer
8 bit Timer/Counter
16 bit Timer/Counter
Timer/Counter Interrupt Programming
ANALOG TO DIGITAL (A/D) CONVERTOR
Introduction of ADC
How does ADC works
ADC using interrupts
Use of ADC with IR sensors
COMMUNICATION PROTOCOLS

SPI – Serial Peripheral Interface

Introduction of SPI

Discussion of SPI Registers

Implementation of Serial Communication between two devices or machines

Applications of SPI (with serial communication)

RS 232 / RS 485

Introduction & Description of RS232 & RS 485

Circuit designing for RS232 for communication between Computer & Microcontroller

Comparison between RS 232 & RS 485

USART – Universal Synchronous Asynchronous Receiver & Transmitter

Introduction of USART

Communication between Computer and Microcontroller through RS232

Communication between two Microcontrollers

Applications of USART

Comparison between SPI, USART, UART and I2C Protocols

AVR PROGRAMMER

Introduction to In system Serial port programmer of Think Ware

Additional Interfaces

Concept of Real world interfacing devices like electrical home appliances / sensors activators, electromechanical devices, Graphical LCD can also be covered.

The fees will include:

- Takeaway Development board after the training for further project work
- A self compiled study material of Thinkware of respective courses
- A CD of compiler in Embedded System

Internship & Training in Robotics Automation with Swarm Robot: ITRS

Robotics is the most fascinating field now a day for engineers, as huge automation is coming into industries.

Recommendation: Beneficial for students interested in making autonomous Robotics, interested in Microcontroller based projects. This training is the wide approach in Robotics.

Prerequisite: General knowledge of electronic components & circuits with basics of “C” language.

- Introduction to swarm robotics
- Wired robots Controller
- Automated robot control
- Robots control mechanisms
- swarm robots Introduction
- Communication Between Robots
- Swarm robotics application in real world

INTELLEGENCE

- Swarm intelligence - Self organization Characteristics of swarm robots
- Artificial intelligence in brief
- Swarm Robotics Design aspects
- Selection of suitable Sensors
- Mechanical structure analysis and design
- Selection of a suitable algorithm

INTRODUCTION TO ATMEGA 32 MICROCONTROLLERS

- Brief introduction , INTEL, Philips, AVR, Microchip
- The AVR Architecture , Hardware Details , AVR Memory Organization
- I/O Port Organization , On Chip Peripherals
- Concepts of Interrupts

INTRODUCTION TO SOFTWARE TOOL CHAIN

- Programming of ATMEGA 32 , Introduction to WINAVR & PONYPROG Software

Programming using Embedded C , Tips to enhance programming skills

COMMUNICATION between Robots

Wired / Wireless Communication

Short / long range wireless communication

Different Sensor used in swarm robotics

Mechanical Design

Assembling of parts like AVR Board , Chassis , Sensors etc...

Practical Swarm Exercise:

Assembling of complete robot

Interfacing of motors and check the movement of motor

Interfacing of sensors

Different type of Robots:

Line follower robot

Grid solving robot

Interfacing of wireless IR communication Module

Communicating a robot with a PC

Implementation of swarm intelligence

Communicating in between the swarm robots

Implementation of various swarm control algorithm

The fees will include:

Takeaway Development board after the training for further project work

A self compiled study material of Thinnkware of respective courses

A CD of compiler in Embedded System

Internship & Training in MATLAB Software & Toolboxes: ITMT

MATLAB is the most upcoming technology based software these days as most of the industries are using its applications.

Recommendation: All category & branch of students can learn this software.

Prerequisite: general knowledge of basics of control system as step response, impulse response, bode plot etc.....

Introduction to MATLAB

- How to open ,quitting and work on command window
- Discussing about important command used in command window
- Work space
- Command history
- How to use HELP and WEB HELP
- Some important matrix operations
- Introduction to some operators
- Introduction to M-file editor
- Editing and debugging M-files
- Basic plotting functions
- Creating plot
- Editing plot
- Introduction to commands

- MATLAB Programming
- Flow control
- Work with multidimensional array
- Cell array
- Characters
- Developing user defined function

- scripts and functions
- Introduction to Simulink
- Introduction to Simulink
- Working on some simulation example
- Detailed Analysis of Control System Toolbox
- General instruction,
- How to create linear model
- Discussion on state space representation
- Transfer function
- Application of control system toolbox
- System gain and dynamics
- Time domain analysis
- Introduction to Computer vision:
 - Discussion on vision sensors
 - Cameras available.
 - Application of vision in robotics and mechatronic systems.
- Digital Image Processing in MATLAB:
 - Basics of MATLAB
 - Image Acquisition
 - Image Processing toolboxes.
- Parallel Port Programming & Machine Control.
- Frequency domain analysis
- Classical design
- Transfer function representation
- LTI viewer detail and explanation about LTI viewer
- Simpower system Blockset detailed analysis
- Application libraries
- Elements
- Measurements
- Machines
- Power electronics

The fees will include:

- A self compiled study material of Thinkware of respective course.

WHAT CAN I DO AFTER THIS TRAINING

After successful completion of training, you can make following types of minor/major industrial projects in different fields like

Robotics:

Micromouse Robot
Distance Measuring Robot
PC Controlled Robot
Fire detecting Robot
Line Follower
Path finder
Robot Guided Vehicle etc.

Home Automation:

Electrical energy Saver
Home security system
Home appliances control by RF/Telephone etc.
Energy meter
Smart kitchen etc.

Industrial Automation:

Real Time Clock
Vehicle's Speed Calculating devices
Data logger
Temperature indicator & Controller

Telecom

Computer Controlled Machinery
Digital data transmission
DTMF based remote
Home appliances control
Telephone call meter etc

Office security/Automation

Smart Card Access Control System
Time Attendance Monitoring system
Electronic voting machine

Your own ideas can also become reality if you put consistent and dedicated efforts learning.

And there are many more...

SCOPE OF COURSES IN INDUSTRY

- The Indian semiconductor and embedded design industry is projected to grow from \$3.3 billion in 2005 to \$43 billion in 2015.

- This tremendous rate of growth will require a large number of skilled professionals.

Expansion plans by MNCs and NASSCOM suggest embedded systems to be the next sunrise sector.

With the technological advancement more and more professionals from the fields of robotics and embedded systems are required. Internships facilitate the practical learning process and also expose students to a hands-on work environment.

It is ideal for students wanting to participate in robotics competitions, make robotics projects, and those who want to put their theory to practice.

STUDENT'S BENEFITS

A certificate will be awarded to each student. This will be recognized as an industrial training certificate in engineering colleges.

Student will be able to do your minor and major projects of academic value on your own.

This will help in developing final year project.

It opens your gate to embedded systems.

A fast emerging technology for Electronics professionals.

Professional Industrial environment will be provided for project work.

Registration Rules:

Registration is to be done by paying an amount of Rs. 1000/- which will be adjusted in the Fees.

Online registration mandatory.

Wrong information filled online can cancel the registration.

Online form filled without paying registration fees will not be considered.

Registration & fees to be deposited before the last dates. Any requests after that will not be entertained.

General Points:

Students can attend free trial seminars before training. We are transparent to prove our best quality services & products. Interested ones to register online for free seminars on 1st May, 1st June, and 1st July.

Only 30 students will be taken in a batch.

All students have to provide a training letter/bonafide certificate from college.

Training can be attended for 4 weeks or 6 weeks.

- Project is the mandatory part of the training.
- In the 4 weeks training, students have to make the project on their own and in the 6 weeks training program, they will be made to do the project under the trainer's guidance
- Students have to face an Interview after the training & project work.
- Certificates will be given after the successful completion of training

The Schedule chart of SIPP-2010:

Course Name	Batch code	Last date of registration	Date of start of New Batch	No. of days for training	Timings
Basic Embedded System	E1	02/05/2010	17/05/2010	M, T, W	9:30 AM- 12:30 PM
	E2	02/05/2010	17/05/2010	M, T, W	1:00 PM– 4:00 PM
	E3	02/05/2010	17/05/2010	M, T, W	4:30 PM – 7:00 PM
	E4	29/05/2010	14/06/2010	M, T, W	9:30 AM- 12:30 PM
	E5	29/05/2010	14/06/2010	M, T, W	1:00 PM– 4:00 PM
	E6	27/06/2010	12/07/2010	M, T, W	4:30 PM – 7:00 PM
	E1M	01/06/2010	15/06/2010	M, T ,W	10:30 AM- 1:30 PM
	E2M	01/06/2010	15/06/2010	M, T ,W	2:00 PM– 5:00 PM
Advanced Embedded System	A1	05/05/2010	20/05/2010	Th, F, S	9:30 AM- 1:30 PM
	A2	15/06/2010	01/07/2010	Th, F, S	9:30 AM- 1:30 PM
Swarm Robotics	S1	05/05/2010	20/05/2010	Th, F	2:00 PM – 7:00 PM
	S2	02/06/2010	17/06/2010	Th, F	2:00 PM – 7:00 PM
	S3	30/06/2010	15/07/2010	Th, F	2:00 PM – 7:00 PM
MATLAB	M1	30/04/2010	15/05/2010	S, Su	9:30 AM- 1:30 PM
	M2	27/05/2010	12/06/2010	S, Su	9:30 AM- 1:30 PM
	M3	25/06/2010	10/07/2010	S, Su	9:30 AM- 1:30 PM

Sl. No.	Course Name	Course fees* (4 weeks) in INR	Course fees* (6 weeks) in INR
1	Internship in Basic Embedded System	4990/-	6490/-
2	Internship in Advanced Embedded System		8990/-
3	Internship in Swarm Robotics	5990/-	
4	Internship in MATLAB	4990/-	6990/-