ASSOCIATED ELECTRONICS RESEARCH FOUNDATION C-53 PHASE-II, NOIDA

(Recognized by DSIR, Govt. of India)
(Accredited by NABL, Govt. of India)

SIX-MONTHS TRAINING PROGRAMME ON EMBEDDED SYSTEM , VLSI MAT LAB AND PCB DESIGN:

COURSE SYLLABUS:

THEORY:

- Introduction to **C programming**. More than 150 programs covering the basics of Conditions, Loops, Functions, Array (Sorting & String), Pointer, Structure, Miscellaneous etc.
- PCB designing using **PROTEL and ALTIUM** Software.
- Overview of operational amplifier & hardware design using op-amps after verification through Simulation in **PSIM Software**.
- **Introduction to 8051, ARM and PIC Microcontrollers**.
- **Embedded System design using Embedded-C language**.
- Projects based on Atmel 89C2051, 89C52, 89S52 Microcontrollers.
- Modeling & Simulation using MATLAB.
- Study of operating system & Linux Shell Programming
- VLSI (Technology & Design).
- Digital Circuit Design.
- VHDL (**Basic concepts, Structural specifications of hardware design organization and parameterization**).
- VERILOG HDL programming with timing & delay model
- Overview of ASIC & FPGA.
- Study of active & passive components; functionality.
- **Exposure to live projects.**
- **Introduction to Field Telephone Set PTR-1000.**

PRACTICALS:

1. Power supply design of +5V, +12V and -12V.
2. AT89C52 & AT89C2051 Microcontrollers card design.
3. Interfacing with LEDs.
   - Different LED patterns.
   - Port Mapping.

4. Seven Segment Display.
5. 4-way traffic Light with & without timer.
6. LCD programming with 4-bit & 8- bit.
7. Scrolling display using Keypad.
8. Interfacing with DC motor.
9. Interfacing with Relay.
10. Interfacing with Sensors.
11. Simulation and synthesis of Verilog & VHDL on ModelSim

PROJECTS:

1. Microcontroller based code lock.
2. LED Voltmeter to measure the voltage ranging from 3V to 12V DC.
3. Path finder based on Infrared signal.
4. Infrared & LDR based microcontroller projects.
5. LCD programming with 4- bit & 8- bit.
6. Scrolling display.
7. Transmission & Reception of string from one microcontroller to another with display on LCD.
8. Automatic temperature controller.
9. Sensing temperature & display on LCD.
10. Automatic controlled Water level indicator using microcontroller AT89C52 with LCD.
11. Over voltage display.
12. 4- Way Traffic Light with LCD display.
13. 8- Way Traffic Light with emergency stop.
14. AC load interface to microcontroller using Relay.
15. Interfacing with DB9.
16. Speed control of DC fan using keypad.
17. Transmission of string using RS232 to hyper terminal of personal computer.
18. Advance 4- way Traffic Light with DC buzzer & timer.(Implemented by Delhi Police)
19. Driverless Metro Train with the concept of emergency brakes using Stepper Motor.

Course also includes visit to NABL accredited lab:

- Characteristics of various components.
- Reliability testing of components and products.
- Product specification interpretation.
- Preparation of test setup for a given set of condition.
- Environment testing.
- Overview of **ISO 17025: 2005** for laboratory management system.

Visit us at: www.aerfindia.com **Email: aerf@aerfindia.com**
For more details please contact us at our Telephones numbers: 0120-4543789-90

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6-Weeks Training Programme on Embedded System

Theory:

- Introduction to **C** programming**;** Basic concepts, Conditions, Loop, Functions, Array (Sorting, String), Pointer, Structure, Miscellaneous etc.
- **PCB designing using Protel and Altium**
- Basics of Microprocessor & Microcontrollers.
- Introduction to **8051**, **ARM** and **PIC** Microcontrollers.
- Study of different architectures.
- Introduction to **Embedded-C**.
- Embedded System design using **Embedded-C language**.
- Concepts to Interface LEDs.
- Programming Tool Introduction (**Keil** & **UPROG**)
- Study Of Seven Segment
- Timer Coding
- Details of **RS232 Timer**, **DB9**, **JTAG**, **Interrupts** its application & programming.
- Seminar on advance technology to give Research & Industrial exposure**;** Interrupts**,** Polling**,** Techniques of interfacing**,** Serial communication**,** Parallel processing**,** Pipelining.
- Projects based on Atmel **89C2051**, **89C52**, **89S52** Microcontrollers.

Practical:

- **More than 100 programs using C Language.**
- **Power Supply +5V, +12V & -12V.**
- **Practical based on µController (89C52 & 89C2051):**
  - LED Interfacing:
    - **a)** LED blinking
    - **b)** Alternate blinking
    - **c)** PORT mapping
    - **d)** Traffic light Controller.
  - Seven Segment Interfacing:
    - Seven segment display using **one** 7- segment.
    - Seven segment display using **multiple** 7- segment.
  - LCD interfacing:
    - **a)** LCD interfacing with 89C52 (4-bit and 8-bit mode) **and** Scrolling Display.
  - Interfacing with **ADC and Keypad.**
  - Interfacing with **Relay, DC Motor and Sensors (IR, LM35 & DS16121)**.

Course also includes visit to NABL accredited lab

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6-Weeks Programme on VLSI System Design:

Theory:

- Study of Active & Passive components and Basic Functionality.
- Review of C language programming.
- VLSI (Technology & Design).
  - Timing, Area, Power
- Digital Circuit Design.
- Verilog
  - Overview and Modeling Concepts of Digital Design
  - Structural Specification Of Hardware Design Organization & Parameterization.
  - Task and Function
  - Advanced Verilog Topics
- VHDL
  - Overview Of Design Units and Language Constructs
  - Digital Design Styles
  - State Machines
  - Functions and Procedures
  - File Operations
- Overview of ASIC & FPGA.
- Seminar on advance technology to give Research & Industrial exposure;

  Interrupts, Polling, Techniques of interfacing, Serial communication, Parallel processing, Pipelining.

Practical:

- Introduction to SPICE family.
- Digital circuit design using advance tool- Simulation and Synthesis.
- VHDL programming- Simulation and Synthesis:
- Design of Networks for arithmetic operations.
- VERILOG HDL programming- Simulation and Synthesis.
- Traffic Signal Controller
- Newspaper Vending Machines

Course also includes visit to NABL accredited lab

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6-Weeks Programme For Mechanical Students:

1. Mechanical Design Lab (AutoCAD 2010).
2. Inspection and testing lab.
3. Prototype workshop.

1. AutoCAD 2010

a) Basic introduction to CAD.
b) Environmental settings.
c) Type of command and their use.
d) Awareness of 2D & 3D mechanical drawing on AutoCAD.

2. Inspection and testing

a) Need of inspection in industries.
b) Basic awareness of measuring instruments and their uses.

Measuring instruments: - profile projector, toolmakers microscope, vernier calipers, micrometer, height gauge, bore gauge, pin gauge, gauge blocks, radius gauge.

Testing instruments: - hardness tester, coating thickness tester.

3. Prototype workshop

a) Basic introduction of lathe machine and practical use.
b) Introduction of milling machine and practical use.
c) Introduction of surface grinder and practical use.
d) Drilling machine and practical use.

Course also includes visit to NABL accredited lab

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6-Weeks Training Programme on MATLAB:

Theory:

- Introduction to MATLAB: About MATLAB, History, Installation, Compatibility, Features, Applications.
- MATLAB fundamentals: MATLAB Basic operations, Matrix operations, Array Operations, Complex Numbers, M File (Script and function files.) and mathematical functions.
- Plotting Functions: Graph functions, X-Y Plots and Annotations, Logarithm and Polar Plots, Subplots, Screen Control and Other Plot (Bar, Hist, Stem Plot).
- Control Statements: "For", "If", "While", Input/ Output Commands.
- Study of Image Processing Toolbox: Basic of Image, Types of images, Conversion of Images from one format to another.
- Operation on Images: Enhancement, Segmentation, Restoration and working on geometrical property of images.
- Algorithm for Vision Based Robot using MATLAB and Personal Computer.
- Study of Control System Toolboxes: Study of different types of Systems (Open Loop and Close Loop), working on their properties: Gain, Stability, and Plotting.
- Study of Signal System Toolboxes: Study Signals, their types, and Properties. Analysis of Signals (Time domain and Frequency).
- Study of Communication Systems: Signal Sources, Types of Noise, modulation & demodulation techniques, Error calculations.

Projects:

1. Vision based Robot.
2. Simulation of Communication System.

Course also includes visit to NABL accredited lab

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