EMBEDDED SYSTEM DESIGN USING MICRO-CONTROLLERS
(May 20-26, 2009)
a Short Term Course

IN THE SERVICE OF
THE INSTRUMENTS WORLD

Course outline and objectives

Embedded computer systems are electronic systems that include a microcomputer to perform a specific dedicated application. (Every week millions of tiny computer chips come pouring out of various vendors, which find their way into our everyday products). We can see the application of embedded systems in many areas. Aircrafts, Airconditioning Systems, Alarm Systems, Automatic Vending, Teller Machines, House hold machines, Traffic Control Systems, Automobiles, Biomedical equipment, Telecommunication equipment, Lifts, Answering machines, Computer peripherals, etc. Embedded microprocessors or microcontrollers are the brain behind these systems. The application of these controllers makes the equipment user friendly, cheap and enables to add features impossible by other means.

The objective of this course is to introduce the participants, the design and implementation of an embedded system and will make the participant proficient in system design. The course covers the 87X51 family of microcontrollers, their programming in 'C' language and interfacing techniques. Special emphasis will be given to provide hands on experience for the participant using a specific hardware and interfacing trainer module. The participant will be trained to solve the given problems on the trainer module. This will provide participant with a hands-on opportunity to learn the fundamentals of design, hardware and software of systems based on embedded microcontrollers. They will also learn to generate code from a flowchart or from a suitable word descriptions of a programming problems. Additionally, the participant will learn the operation of the microcontroller's I/O functions and the external devices driven by the microcontroller. Hardware and software design issues are discussed for specific systems implemented using 87X51X89C51 as the embedded microcontroller. *The laboratory component in this course is about 65%.* All exercises will have programming in 'C' language. The participant will be required to solve 60 problems on the target board.

Course contents

1. Introduction to embedded systems
2. The 8051 family of Microcontrollers
3. 'C' programming for microcontrollers
4. I/O ports Programming
5. Timer/Counter hardware and its device driver
6. Serial communication interface and its device driver
7. Interrupts Programming
8. Embedded software development cycle and the environment
9. Debugging techniques for embedded software and the role of cross simulators
10. Real World Interfacing case studies : LCD, Sensors, Stepper Motor, Keyboard, Personal Computer
11. Design of serial devices
12. Concept of finite state machines and examples like stop watch, stepper motor control through PC
13. Design and development of test beds with PC control
14. Remote control of systems using IR remotes used in Commercial TV remote control modules
15. Simple multidrop communication networks with examples
16. Simple wireless communications with examples

Eligibility

This course is suitable for scientists and engineers who are using or planning to use microcontrollers for their work. The participant can be a bachelor of Engineering, Master of Science or Master of Computer Applications.

The requirement for the admission for the course is knowledge of architecture of any microprocessor/ microcontroller and familiarity with 'C'-language.

Course Fee

- The course fee is Rs. 5,000/- (10% concession for ISOI life members)
- Course Fee includes course materials, lunch and refreshments.
- The participants have to make their own arrangements for accommodation. However ISOI can help in getting accommodation in nearby place.
- Last date for receipt for applications along with registration fee is **5th May 2009.**

Organised by
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