EMBEDDED SYSTEM DESIGN USING ARDUINO

Description:

Embedded system basically is a computer system that is designed to pull off a few or one specific function, more often than not in real-time computing constraints. "ARDUNIO" most widely used technique of embedded systems. An Arduino is an assembled board of Atmel 8-bit AVR microcontroller with additional components to facilitate programming. An important aspect of the Arduino is the standardized way in which the connectors are exposed, providing a facility to the CPU board to get connected to a variety of interchangeable add-on modules known as shields. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller

Course Outcome:

The students will:

- Learn the basics of electronics, including reading schematics (electronics diagrams)
- Learn how to prototype circuits with a breadboard
- Learn the Arduino programming language and IDE
- Acquire Program basic Arduino examples
- Prototype circuits and connect them to the Arduino
- Program the Arduino microcontroller to make the circuits work
- Connect the Arduino microcontroller to a serial terminal to understand communication and stand-alone use
- Explore the provided example code and online resources for extending knowledgeabout the capabilities of the Arduino microcontroller

Session Plan:

Si no	Session	Topics
1	Session 1	• Embedded Systems Introduction. • Different Microcontroller Architectures (CISC, RISC, ARISC).
2	Session 2	• Internal Resources & Hardware Chips in Details. • History of AVR Microcontrollers and Features
3	Session 3	• Memory Architectures (RAM/ROM). • Introduction to ARDUINO
4	Session 4	• ARDUINO History and Family • Programming in Embedded -C
5	Session 5	• Concepts of C language. • General Hardware Interfacings:
6	Session 6	• LEDS and Switches
7	Session 7	• Seven Segment Display and Multi Segment Display
8	Session 8	• Relays (AC Appliance Control) and LCD
9	Session 9	• Buzzer, IR Sensors and other digital sensors
10	Session 10	• Matrix Keypad, ACD Interfacing and PWM
11	Session 11	• UART Communication (MCU to PC) • UART Communication (MCU to MCU) • Graphical LCD
12	Session 12	• RTC Based Real Time Clock • Various Real Time Sensor Interfacing: • Accelerometer/Gyro/Tilt Sensor
13	Session 13	• Analogue Sensors (Temperature, Gas & Alcohol) • UART Based Sensors (Color Sensor, Humidity Sensor)
14	Session 14	• Concepts Of Robotics using ARDUINO • Different types of motors (DC, Gear, SERVO)
15	Session 15	• Motor Speed Angle & Direction Control
16	Session 16	• Study of Robotic ARM & Robotic Car
17	Session 17	• Project
18	Session 18	• Project
19	Session 19	• Project
20	Session 20	• Project Evaluation