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MSP430 LANCHPAD SVSEMBEDDED SYSTEMS COURSE/HOBBY LEARNING/DEVELOPMENT KIT

Introduction to 'C':

- About 'C'
- Number system and working examples.
- 'C' Data types/Operators/Precedence.
- Basic GCC commands.
- Refresh Basic 'C' Programming.

Learning 'C':

- 'C' coding style rules.
- Compilation steps.
- Object/Executable file format.
- Linkers/Loaders and functionalities.
- Process image and its sections.
- 'C' process environment on Linux.
- Bit-wise operator's examples
- Preprocessor directives and examples.
- Arrays and Strings.
- Structures/Unions/Enumerations.
- Functions & Pointer.
- Dynamic memory allocation (Malloc, Calloc, Free).
- Files and Files Operations.

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- Standard I/O Library.
- Header Files.
- 'C' Program with multiple files.
- Storage classes.
- Const and volatile qualifiers.

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- Introduction to Embedded Systems.
- Architecture of Embedded System.
- Programming for Embedded System.
- The Process of Embedded System Development.
- Communication Interfaces.
- Embedded/Real-Time Operating Systems.
- Embedded Software Development on different Microcontrollers.
- Network Programming.

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Module-1

1. Introduction to Microcontrollers.
2. Microcontroller's vs Microprocessors.
3. Introduction to MSP430.
4. MSP430 Architecture.
5. Basic Registers and addressing modes.
6. Special function Registers.
7. Instruction set.
8. Interrupts & Timers.
9. Programming Microcontrollers in 'C'

10. Introduction to CCS (Code Composer Studio v5).IDE Tools.
11. Understanding Basic Devices.
    - Light emitting Diodes [LED].
    - Switches.
    - Liquid Crystal Displays.
    - Seven segment display.
    - Matrix keypad.
    - Replays.
    - Buzzers.
    - Dc Motors & PWM [Pulse Width Modulation].
    - Stepper motors.
    - Sensors and signals Conditioning

LAB WORKS:

➢ Building a user Interface

1. Interfacing a light emitting diode.
2. Interfacing Switches.
3. Interrupts.
4. Timers and counters.
5. Interfacing a LCD Display.
   1. 8bit mode.
   2. 4bit mode.
   3. LCD Menus.
6. Interfacing a 4x4 Matrix Keypad.
7. Pulse Width Modulation.

- **Hardware Interfacing Basic Devices**
  - LED.
  - Switches.
  - LCD.
  - 7-Segment display.
  - Keypad.
  - Relays.
  - Buzzers.
  - DC Motors.
  - Stepper Motors.

Module-2

- **Serial Communication.**
  - MAX-232.
- **Asynchronous Communication.**
  - RS-232
  - RS-485
- **Synchronous Communication.**
  - SPI
  - I2C
  - EEPROM
  - Real Time Clock
  - Converters
  - ADC
  - DAC
- Infrared & Radio Frequency.
- Interfacing Microcontrollers.

LAB WORKS:

1. RS 232.
2. RS 485.
3. Interfacing Microcontrollers to Microcontrollers.
4. Interfacing Microcontrollers to Computer.
5. SPI Protocol.
6. EEPROM Using I^2C
7. ADC
8. DAC

Module-3(learning of technologies)

- **Interfacing different devices.**

1. WI-FI
2. BLUETOOTH.
3. GSM.
4. GPS.
5. RF-ID.
6. FRINGER PRINT.
7. RF.
8. Xbee.
9. GRAPHICAL LCD.

Module4: (learning of Protocols)

Embedded Protocol

- I^2C.
- SPI.
- CAN.
- RS 232, RS 485.

Module5: (ACADEMIC PROJECTS ON DEVELOPEMNET KIT)

The above development board will guide u the 10 different technologies for the student.svsembedded will provideSthe CD in that

WE WILL PROVIDE

1. ABSTRACT
2.DATASHEETS
3.DOCUMENTATION
4.SCHEMATIC DIAGRAM.
5. SOFTWARE CODE
6.SAMPLE PPT
7.PHOTOS&VIDEO FILE ON ENTIRE PROJECT