V.I.P.E.R.

Vacation Internship Program on Embedded System and Robotics

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Robogenesis comes up with a Vacation Internship Program in Embedded systems and Robotics (V.I.P.E.R). This program is pegged at giving in depth fundamental knowledge and exposing students to practical working environments of the industry. This is the program for those who have a passion for technology and think that this is the only way to bridge the gap between theory (whatever is taught in the classroom) and practical (what is used in the industry).

V.I.P.E.R is a program where you will be given the complete in and out training starting right from the basics of microcontrollers which are specifically used in the Indian Embedded Industry and we do provide a certificate which will help you out with your placements. As we said, it's a platform for those who have the passion for embedded systems and want to enhance their knowledge.

- **Fundamentals of Embedded system**
  - Introduction to Embedded systems
  - Exposure to different architectures (RISC vs. CISC)
  - Application of Embedded systems in today's world.
  - Embedded Systems in Industry.
- **Fundamentals of AVR**
  - Introduction to AVR family.
  - Learning AVR used in the board.
  - Getting used to the platform.
  - Using WINAVR for programming.
  - Understanding AVR instruction set.
  - Assembly vs. C
- **C programming for AVR**
  - Introduction to C
  - Data Types, operators and expressions
  - Developing header files

- **Embedded C programming**
  - Configuring ports and controlling their status
  - Interrupts and timers
  - Accessing internal registers and EEPROM
  - Interfacing:
    - Switches
    - LED'S
  - PWM based motor speed control.
  - ADC based applications
  - UART (RS-232)
  - I2C
  - SPI
  - RC5
  - IEEE 802.15.1 Protocol

- **Interfacing Peripherals**
  - RF Transmitter and Receiver
  - Matrix LED
  - DTMF
  - Touch Screen
  - Temperature sensor
  - Metal detector
  - Accelerometer
  - Servo motor
  - Light Sensor
  - DS1307 RTC
  - HC 05 Bluetooth Module
  - RGB LED
  - PIR SENSOR
  - MATRIX KEYPAD

- ***Introduction to RTOS***
  - Real time system concepts (OS vs. RTOS)
  - Need for an RTOS
  - RTOS applications/examples.

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- **Projects to be done**
  - Mobile Controlled Robot
  - Radio Frequency controlled robot
  - Gesture controlled robots using accelerometer
  - IR controlled robot using TV Remote
  - Computer controlled robot
  - Matrix led Programming
  - Temperature controlled Fan
  - Emergency lighting system
  - Touch Screen Controlled robot
  - Implementation of PWM for speed control of motors
  - Servo motor control
  - Colour sensing using Matlab
  - Ball following robot
  - PCB designing
  - Bluetooth Controlled robot
  - Line Follower
  - Obstacle Avoider
  - Obstacle Follower
  - Light Controlled Robot
  - RGB Led Control for traffic light application
  - Swarm Robotics using Bluetooth
  - Implementation of RTC
  - Motion sensing using PIR SENSOR
  - SPI communication between Microcontrollers
  - Metal Detecting robot

- Our USP
  - Using MSRDS with SPL
  - Construction of Humanoid

The course content has been divided day wise so that the participant will get to know what he will be learing on each day

1st day:

- ✓ Fundamentals of embedded system
- ✓ Fundamentals of AVR
- ✓ C programming for AVR
- ✓ Embedded C programming
- ✓ Creating Header files
- ✓ Interfacing peripherals like led, switches, buzzer
- ✓ RGB Led control
- ✓ Generating frequency based programs
- ✓ Things to do
  - Mobile controlled robot
  - Radio frequency controlled robot

2nd day:

- ✓ Serial communication protocol (UART)
- ✓ RC5 protocol
- ✓ IR controlled robot using TV remote
- ✓ Computer controlled robot
- ✓ Matrix led programming
- ✓ Line follower
- ✓ Obstacle avoider
- ✓ Obstacle follower

3rd day:

- ✓Inter facing sensors(Analog and Digital)
- ✓ Touch screen controlled robot
- ✓ Timers and Counters
- ✓ Gesture controlled robots using accelerometer
- ✓ Servo motor control
- ✓ Light controlled robot
- ✓ Emergency Lighting System
- ✓ Tempertaure controlled Fan

4th day:

- ✓ Implementation of PWM for speed control of motor
- ✓ Servo motor control
- ✓ Bluetooth Protocol
- ✓ Bluetooth controlled robot
- ✓ Swarm robotics using Bluetooth
- ✓ I2C Protocol
- ✓ Implementation of RTC

5th day:

- ✓ SPI Protocol based Communication
- ✓ Matlab.
- ✓ Color sensing robot.
- ✓ Ball following robot.
- ✓ Motion Sensing using PIR sensor
- ✓ Metal Detecting Robot

6th day:

- ✓ Robotic arm
- ✓ Matrix keypad
- ✓ PCB designing.
- ✓ Using MSRDS and SPL
- ✓ Construction of humanoid
- ✓ Project work