

Robotics Curriculum

Curriculum



Durations: (6 Months)

⇒ Intro to Robotics

- What is a Robot?
- Applications of Robots.
- Requirements of Robotics
- Components of a Robot

⇒ Practical Electronics

- Resistance (Why, Where and how)
- Capacitor (Why, Where and how)
- Inductor (Why, Where and how)
- Diode (Why, Where and how)
- Zener diode (Why, Where and how)
- Microphone (Why, Where and how)
- Relays (Why, Where and how)
- Buzzer (Why, Where and how)
- Transistor npn/pnp (Why, Where and how)

⇒ Power supply designing

- Step down
- Rectifiers
- Voltage Regulators
- Filter Circuit
- Battery based power supply

⇒ Major ICs in Robotics

- 555 Timer
- LM358
- L293D
- L298
- 741
- Digital ICs like gates
- Max232
- 8870 etc.

⇒ Motors and Actuators

- DC Motor
- DC Geared Motor
- Stepper Motor
- Servo Motor
- Control Circuit and Drivers

⇒ The world of sensing

- Temperature Sensor
- Surface Sensor
- IR Sensor
- PIR Sensor
- Touch Sensor
- Color Sensor
- Heartbeat Sensor
- Alcohol/Gas Sensor

⇒ Basics of Automatic Robotics (Embedded System)

- Introduction to Embedded System
- Applications of Embedded System
- Components of Embedded System
- Discussion on Microprocessor Vs Microcontroller
- CISC Vs RISC
- Von Neumann Vs Harvard Architectures
- Memory mapped I/O Vs I/O Mapped I/o

⇒ Embedded 'C' Programming

- Introduction to 'C' Programming
- Features of 'C' Programming
- Concepts of algorithm, Resources
- Programming Structure
- Data Types, Variables, Operators Assignment & Selection
- Looping, Functions, Array
- Pointers
- Code Writing in Embedded 'C' Language
- Working with Keil Compiler

⇒ Introduction to 8051

- 8031/8051/8052 Architecture
- Pin description
- Internal Memory discussion
- SFR
- Addressing Modes
- Instruction Set

⇒ PIC Microcontroller

- Introduction To PIC
- Internal Architecture of PIC
- Diff. between CISC& RISC
- Introduction to mikroC
- PIC Programming in mikroC

⇒ **Interfacing with Microcontroller**

Logic Controller Interface
LED, LCD, 7-segment, Matrix Display, Traffic Light System Interface
Interfacing with Switches, Matrix Keypad
Interfacing with DC Motor, Stepper Motor etc.
Interfacing ADC, DAC, RTC
Working with inbuilt Timer-Counter Section
Interrupts & ISR

⇒ **Protocols**

I2C
SPI
UART
USART
Introduction to CAN

⇒ **Introduction to comm. system**

What is comm.?
Modes of comm.
Requirements of comm.
Peer to Peer comm.
Line of Sight comm.
Broadcasting
Multicasting
Error detection and error correction techniques
Modulation & Demodulation
Modulation Techniques
Data Encryption and decryption

⇒ **Wireless Technologies**

Introduction to wireless Technologies
RF transmitter and receiver
IR Transmitter and receiver
DTMF
RFID
Introduction to GSM Modem
AT Command set
Introduction to Bluetooth, X-bee, Wi-Fi, Wi-max comm. techniques

⇒ **Mechanical Structure Designing**

Degree of Freedom
Type of design
Selection of Materials
Fastening & Assembling
Mechanism
Types of Motion

⇒ Real time Robotic applications (Designing)

Temperature Monitoring Robots
DTMF Based Robots,
RF controlled Robots
Line Follower Robot
Light Phobic Robot
Light Loving Robot
Rhex Robots
Surveillance Robot
Robotic Tanks
Robo Fighter



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