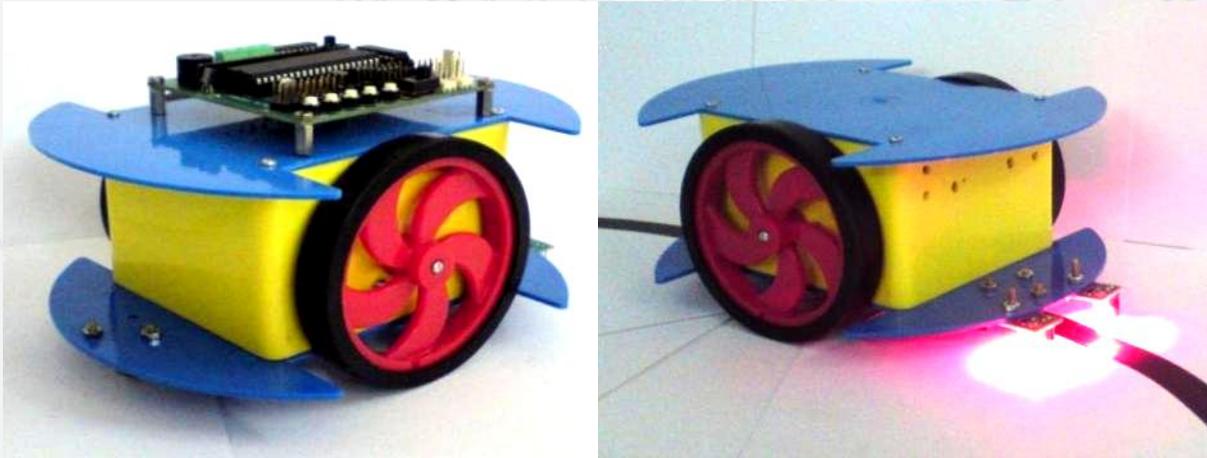# AUTOBOTZ

Autonomous Robots using Microcontroller- AVR/ 8051

"The principal goal of education is to create men and women who are capable of doing new things, not simply repeating what other generations have done."

-Jean Piaget

AutoBotz-AVR

AutoBotz is a microcontroller based introductory autonomous robotics workshop by Technophilia, where you learn the art of making autonomous robots. This workshop teaches you the fundamentals of designing and building autonomous robots by integration with a microcontroller. It also focuses on conceptualization and designing of complex systems and will help clear concepts related to embedded systems, artificial intelligence and automation.

Apart from the theoretical sessions, participants would be working on autonomous robotic kit specially designed by Team Technophilia. This kit includes, microcontroller based board, sensors, actuators etc. Hands on sessions on this kit will help the participants to enhance their embedded C programming and PC hardware interfacing skills.

What will you learn after attending the workshop:-

- Details on microcontroller
- Programming the microcontroller using embedded C
- Interfacing and controlling various devices like keypad, LED, motors, sensors etc with microcontroller
- Implementing UART communication protocol and making wired PC controlled robot
- Making of various types of robots their algorithms and coding
- Application of microcontrollers and embedded C in industry, military, medical, home appliances, home-automation etc

The Robots can be made using this kit:-

- Line follower robot
- Path memorizing robot
- Obstacle Avoider and Follower Robot
- Photo Phobic and phototropic Robot
- Fire fighter robot
- Wall Follower robot and many more……

The concepts to be covered are:-

- Types of Autonomous Robots
- Elements of an autonomous robot
- Microcontroller based robots
- Pre programmed robots
- Self learning robots

Microcontroller

- Overview of available microcontrollers
- The AVR series of microcontroller and its core
- Its features and capabilities

Programming

- Embedded C
- Use of Embedded C IDE
- Use of burner/flashing tool
- Writing code in embedded C
- Accessing various functions of microcontroller using embedded C
- Implementation of various algorithms in embedded C
- Implementation of artificial intelligence using embedded C

Actuators

- DC Geared motors
- Stepper Motors
- Servo Motors

Motor Drivers

- Motor driver using Transistor
- H-bridge IC motor drivers

Implementation of UART Communication Protocol & making PC Controlled Robot:

- Basics of UART Communication Protocol
- Frame Format, meaning of 8N1 etc
- Hardware & software used (COM Port, USB to Serial Converter/BAFO, HyperTerminal)
- Understanding the different parameters of UART e.g. baud rate, parity etc
- Making PC controlled robot

Sensors

- Light: LDR, photodiodes, phototransistors
- Heat: Temperature sensor LM35
- Sound: Microphone, Ultra-Sonics
- Mechanical touch sensor

The Training kit contents:-

1. Microcontroller development board with the following features:

- Built with popular Atmel's AVR Microcontroller
- On-board LCD interface option (it can also be used for any other general purpose application)
- On-board Motor Driver for connecting 2 DC motors / 1 Stepper motor
- On-board 5v regulated power supply
- Onboard 12MHz external crystal connection
- Onboard 2-tact switches for external input and reset
- Onboard 4 test surface mounted LEDs for status and debugging purpose
- Onboard 2 supply indicator LEDs
- Onboard dual power supply option through DC source (6V to 16V) or USB power
- On board USB programmer
- Onboard exposed ISP pins for programming
- Onboard exposed I/O pins
- Onboard exposed I/O pins for ADC and sensors with 5V/1A power supply
- Provision for connecting/interfacing Servo motors
- Provision for PC interface through UART
- Provision for connecting Buzzer
- Provision of I/O pins for servo motors and sensors with dual power supply option

2.	Optical sensors	(2)
3.	Serial cable	(1)
4.	USB cable	(1)
5.	A set of robotic chassis	(1)
6.	Geared DC motor	(2)
7.	Molded plastic Wheels with rubber grip	(2)
8.	Ball caster with 360 degree freedom	(2)
9.	Batteries for power supply	(2)

Duration: 2 days (8 hours each day) properly divided into theory and hands on sessions.