



Educational Workshop Series

## 3-Days Robotics Workshop : Learn to build wireless robots

<b>LEARN</b>	The basics of robotics , circuits and motors .How to solder, how to build a circuit on breadboard and finally how to build a wireless robot
<b>FOR WHOM</b>	<ul style="list-style-type: none"><li>6<sup>th</sup> – 12<sup>th</sup> standard Kids with keen interest in electronics as hobby</li></ul>
<b>WHEN</b>	6 June 2012 - 10AM – 4 PM 7 June 2012 - 10AM – 4 PM 8 June 2012 - 2PM - 5 PM
<b>WHERE</b>	E-Class Room, Venture Center (Entrepreneurship Development Centre) 100, NCL Innovation Park, National Chemical Laboratory Campus Dr Homi Bhabha Road/ Pashan Road, Pune -411008
<b>CONTACT</b>	Administrative queries: Miss Lipika Biswas 100 NCL Innovation park, Dr. Homi Bhabha road, Pashan, Pune- 411008 Phone no- 20250934 Email:- eventsdesk@venturecenter.co.in  Technical queries: Mr S Basu; Phone: +73500-39098 ; +91-9260462088  For more information, visit: <a href="http://www.venturecenter.co.in/workshops/">http://www.venturecenter.co.in/workshops/</a>
<b>FEE</b>	Rs 2500/- per participant Limited seats – 25

### Workshop description

Robotics is a multi-disciplinary subject with roots in electronics , computer science and mechanics. Although it is not taught in schools , a lot of kids still pursue it as a hobby while struggling to find out why something works or does not work. In this workshop we teach kids how to read a circuit diagram , how to identify different electronic components and how to put together components to build a circuit. Since we aim to learn by examples , we build different components of a wireless robot and put them together to watch it come alive.

### Synopsis

- Learn the basics of passive circuit elements with the help of experiments
  - Resistor
  - Capacitor
  - Inductor

- Learn to identify active circuit components
  - Diode
  - Transistor
  - Integrated Circuit
- Learn the symbols and how to read a circuit diagram
- Learn how to use a Multimeter
- Learn How to make a circuit on breadboard
- Learn how to make a circuit on PCB (By Soldering)
- Make a :
  - Encoder
  - 38Khz Oscillator
  - IR emitter
  - IR Sensor
  - Decoder
  - Motor Drive
- Learn by experiments why a DC motor rotates
- Put it all together to build a awesome Wireless Robot

## Target audience

- 6<sup>th</sup> – 12<sup>th</sup> Standard Students in Science
- The workshop assumes students have keen interest in electronics

**LUNCH NOT INCLUDED. PLEASE CARRY YOUR OWN LUNCH BOXES.**

## Schedule

Timings	Topic	Duration	Comments
<b>Day 1 :</b>			
10:00 - 11:00	Passive Circuit Experiments	60 mins	Introduction to Electronics
	Learn the symbols		
11:00 - 11:15	Break	15 mins	
11:15 - 13:00	Identify the components	105 mins	Semiconductors
	Learn the symbols		
	What is a multimeter		
	What is a Breadboard and PCB		
13:00 -13.30	Lunch	30 mins	
13.30 – 14.30	What is Infra-Red	60 mins	Circuit Making
14:30 -14:45	Break	15 mins	
14:45 – 16:00	What is an Encoder	75 mins	
Timings	Topic	Duration	Comments
<b>Day 2 :</b>			
10:00 – 11:00	Making a Transmitter	60 mins	
11:00 - 11:15	Break	15 mins	
11:15 - 13:00	What is a Motor	105 mins	Motor Basics
	Experiments with DC motor		
	Build a Dual Motor Drive		
13:00 -13:30	Lunch	30 mins	
13:30 - 14:30	What is a Decoder	105 mins	Circuit Making
14:30 -14:45	Break	15 mins	

Timings	Topic	Duration	Comments
14:45 – 16:00	Completing the PCB	120 mins	Soldering Time
<b>Day 3 :</b>			
14:00 – 15:00	Make your Robot	60 mins	Robot Building
15:00 - 15:15	Break	15 mins	
15:15 - 17:00	Sumo Wrestling with Robots	105 mins	Play Time
	Certificate Distribution		

## Faculty

The workshop shall be taught by Mr **S. Basu**.

**Profile :** Indian National Maths Olympiad awardee , 1998 .Design Engineer with experience in both Digital and Analog Design. Experienced in a multitude of EDA and simulation tools. Strong interests in Embedded systems design and multicore code design. Hobby Robotics fan and entrepreneur in related field. Puzzle solving enthusiast. Founding member of IIT Kharagpur Robotics Club.

**Education :** B.Tech (H) '03 , M.Tech '04 (Indian Institute Of Technology , Kharagpur)

**Experience:** Component Design Engineer for Intel India's first Multicore project; Co-author of Enhanced Structural Tester Based Functional Test methodology for Intel Multicore processors; Mixed-Signal Design Consultant for National Semiconductor's Sponsored Project at IIT Kharagpur; Currently Adjunct Faculty of Electrical Engg., College Of Engg. , Pune

**Research and previous Workshops:** Behavioral Modelling for Mixed Signal Sytems using Verilog-AMS speeding up simulation times by 1000x; Analysis of spice simualtion engine for simulation speedup; Computer Architecture : Multi-core programming using Message Passing Interface and CUDA; Workshop on Behavioral Modelling at IIT Kharagpur;Workshop on SPICE at College of Engg, Pune; Workshop on Digital Design at Venture Center, Pune, Workshop on Multi-Core computing at Venture Center , Pune , Workshop on Maths Olympiad Training at venture center , Pune.

## Workshop Includes

- Fun experiments and practical sessions
- Electronics Kit to build and carry home
- Joining a mailing list community of hobby robotics enthusiasts
- Certificate of Participation from Venture Center

## About the organizers

Venture Center strives to nucleate and nurture technology and knowledge-based enterprises by leveraging the scientific and engineering competencies of the institutions in the "Pune region" in India. The Venture Center is a technology business incubator specializing in technology startups offering products and services exploiting scientific expertise in the areas of materials, chemicals and biological sciences & engineering. The Venture Center is the trademark of Entrepreneurship Development Center, a not-for-profit company hosted by the National Chemical Laboratory, Pune, India. More information is available at:

<http://www.venturecenter.co.in/>