**Booyaka Mini(Level-2)**

**1. Course overview**

**Age group:** 9+ years

**Course duration:** 24 Sessions

**Main concepts:**

* Implementing and testing algorithms using Leap Blocks Building structural robots
* Programming robots using Leap blocks and Arduino
* Intro to basic sensor technology like LDR, IR & Ultrasonic sensor
* Intro to wired and wireless communication with IR remote and USB to serial controls.

**Description:**

* Conceptual understanding of Robotics components like Sensors, Controllers and wireless communications.
* Learn the basics of programming in a playful, interactive environment using OTTO BLOCKS visual programming.
* Learn Logic building fundamentals using OTTO BLOCKLY

**2. Course Structure**

**Number of sessions:** 24

**Duration :** 36 hours

| **Level 2 Curriculum** | | | |
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| **Session #** | **Session Type** | **Session Topic** | **Description** |
| 1 | Theory | Introduction to Mechanical tools | Students will learn  to operate  Mechanical components  such as Nuts and bolts. Tools like Screw  driver, Spanner, nose player, Cutting player. |
| Activity | Program using OTTO  blockly | Students will program basic statements using OTTO blockly software |
| 2 | Theory | Introduction to BOOYAKA RGB | Students will learn about how  to blink the different colors on RGB LED |
| Activity | Practicals With RGB LED | Students will learn how to blink the different colors with RGB led in LEAP BLOCKS. |
| 2 | Theory | Introduction to Logic Gates | Students will be introduced to AND, OR, NOT gates |
| Activity | RGB LED with LOGIC gates. | Students will program basic statements using OTTO blockly software and RGB LED |
| 3 | Theory | Introduction to IR sensor | Students will be introduced to concept of IR sensor. |
| Activity | Build Wall follower Robot using IR sensor | Students will build Wall follower Robot using IR sensor |
| 4 | Theory | Introduction to ultrasonic sensor | Students will be taught about concept of ultrasonic sensor |
| Activity | Distance Measurement using Ultrasonic Sensor and Booyaka | Students will identify distance using ultrasonic sensor using OTTO blockly |
| 5 | Theory | Introduction to Loops using OTTO Blockly | Students will get to learn about repeat loop using otto blockly |
| Activity | Build Edge avoiding Robot | Students will build and program Edge avoiding Robot |
| 6 | Theory | Introduction to BOOYAKA RGB | Students will learn about the concept of RGB. |
| Activity | Practicals With RGB LED | Students will learn how to blink the different colors with RGB led in LEAP BLOCKS. |
| 7 | Theory | Introduction to IR communication | Student will learn about IR communication |
| Activity | Build and control mobile Robot using IR remote and receiver. | Students get to build Mobile Robot and control using LEAP BLOCKS programming |
| 8 | Theory | Introduction to LDR | Students will be taught about Light Dependent Resistors (LDR): Working Principle. |
| Activity | Automatic street Light using LDR and RGB LED | Students will be practice to build Automatic street light using LDR sensor and RGB LED |
| 9 | Activity | Automatic light detecting Robot | Students will build Robot which can detect light automatically. |
| 10 | Theory | Synchronizing buzzer for different sounds | Students will taught of how to using buzzer for different sounds. |
| Activity | Build Ambulance model using Buzzer and RGB LED | Students will build Ambulance model using Buzzer and RGB |
| 11 | Theory | Introduction to the PWM ( Pulse Width Modulation ) principle and Servo Motor | Students will be introduced to  PWM and Servo motor principle |
| Activity | Build Autonomous Robot using Ultrasonic sensor and servo motor | Students will be taught about connecting software and Brain. |
| 12 | Theory | Introduction to Gears | Students will be taught about Gear concepts and learn to operate calculations on the gears |
| Activity | Build pick and place robot | The students will learn and build pick and place Robot using gears and servo motor |
| 13 | Activity | Make to Line follower Robot | Students will build and program Line follower Robot using IR sensors |
| 14 | Activity | Build your own Robot model | Student will build Own Robot or Model using OTTO BLOCKLY and BOOYAKA |
| 15 | Theory | Introduction to concept of parallel and Linear motion | Students will taught of linear motion and parallel Motion |
| Activity | Mechanism using SERVO and Linear Gear | Student build model using linear gear and servo motor |
| 16 | Activity | Build Remote control Mechanism using IR remote and Servo motor | The students will build Robot using IR remote and SERVO motor and programming using BLOCKLY |
| 17 | Mini project | MINI PROJECT  or  OWN PROJECT | Build own project using sensors and BUZZER, RGB LED using IR communications |
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| 18 |
| 19 | Theory | Introduction to USB to Serial Communication | Students can taught of introducing USB to Serial communication |
| Activity | Build USB to Serial communication using Keyboard and Booyaka brain | Students configure Booyaka serial communication with PC keyboard. |
| 20 | Activity | Introduction to IR remote and Serial communication | Identify Remote keys values using Serial monitor. |
| 21 | Activity | Build Soccer Robot using Servo Motor and IR remote | Student build soccer robot using IR Remote and Servo motor |
| 22 | Major Project | Students build own model using booyaka components and OTTO blockly | Students build own model using booyaka components and OTTO blockly |
| 23 |
| 24 |

| **3. FAQ’S** |
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**Course FAQ’S:**

**1. How do beginners learn robotics?**

If your child is completely new to robotics and wants to learn some new

skills, here's what your kid will be doing:

* Learn about the basics of robotics.
* Decide what project to work on.
* Know about the applications of the project chosen.
* Choose simple equipment (not advanced or industrial level tools).
* Consult a mentor or a teacher (out trainer) who can guide them with the project. It is always good to have someone to guide them at the start.
* Don't make your project too complex; this might be your kid’s first
* project, so take it easy.
* Once the model is complete, test it.
* Rule out possible reasons for outcome after each attempt.
* Rectify or change your project as per need.

**2. What are the concepts covered in the Curriculum?**

In this course you will learn about OTTO Blockly software, the program flow,

Flowchart of program and Procedure to debug code, Booyaka brain, RC

receiver and remote controller. They will be introduced to basic

electronics and science concepts such as Gears and types of gears, the

working of DC Motors and types of motors, concept of distance, Wheel

and speed, LDR sensor, IR Sensor, Ultrasonic Sensor Wireless controls like IR Receiver and Bluetooth controls, concepts and applications of Energy power sources and Input / Output devices.

**Technical FAQ’s:**

**1. What are mechanical tools?**

A mechanical tool is a machine for handling or machining metal or other

rigid materials, usually by cutting, boring, grinding, shearing, or other forms

of deformation.

**2. What is the significance of OTTO / LEAP BLOCKS?**

OTTO Blockly / LEAP Blocks is a Robotic & GUI Coding

Educational Platform, building up STEM Education Ecosystem for kids.

With blocks and electronic parts, Kids can build and run various robot

models in a fun way using BLockly software.