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# **Your School Our Lab Our Teacher Your Success**

**We will be supporting 50  
Schools by implementing  
Robotics Lab at 0  
Investment**



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# OUR LAB

A lab towards Excellence and create prodigies

[bostonusaeducation.com](http://bostonusaeducation.com)



Annual Maintenance For Lab



Physical Trainer



Basic Interior Touch Up



Comprehensive Curricular



Robotics Equipment



Coding Learning



3D Printing and Drone Course



Entrepreneurship



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[bostonusaeducation.com](http://bostonusaeducation.com)

Total number of Classes per section : 40  
Total number of classes per month : 4

Each class = 40 min

Grade-1,2

Grade-3,4

Grade-5,6,7,8

Grade-9,10

Project for Grade -1,2

Project for Grade- 3,4

Project for Grade- 5,6,7,8

Project for Grade- 9,10

# CURRICULUM OUTCOMES

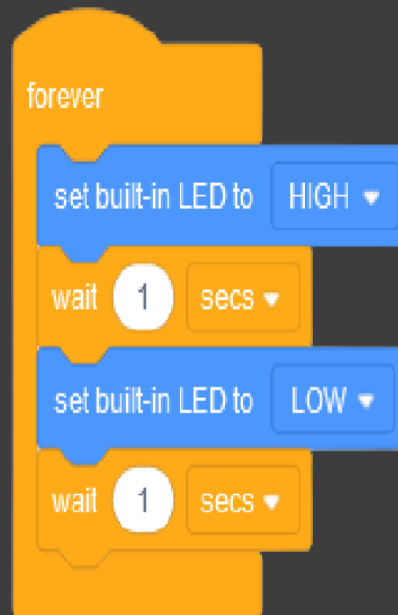


# Grade 1 and Grade – 2

- Drag And Drop coding in which we will learn about different Coding Concepts like Events, Sequencing, Loops, Conditional Statements, Functions Etc.

These Concepts will be made using worksheets based on interactive activities

- Science Projects- Various science related projects will be covered under this like balloon race, jelly maker



## Scratch programming

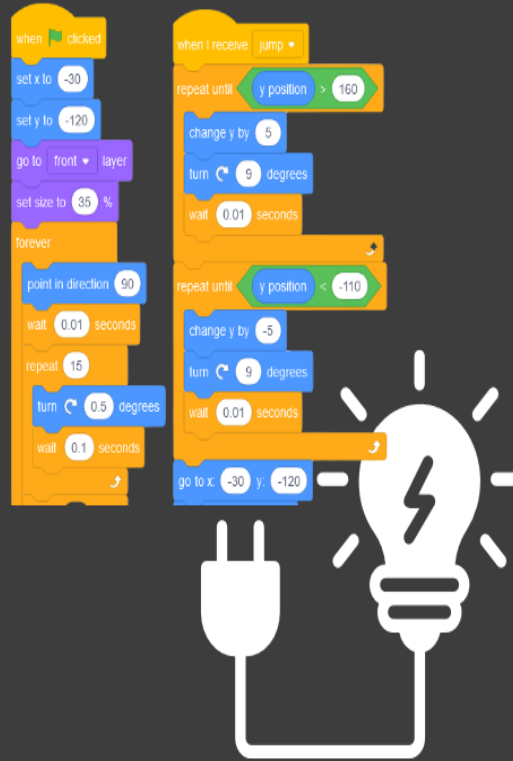
- Introduction to the course | Account making
- Sprites | backdrops | commands
- Events | variables | coordinates systems
- Broadcast events | clone | blocks
- Storyboard
- Chatbot
- Fruit Catcher Game
- Shark Attack Game
- Bell Racer Game
- Catch The Banana Game
- Snake Game
- Flappy Parrot Game
- Pong Game
- Quiz App
- Paint App | Basics
- Allen Shooter Game
- Wizard Soccer Game
- Monster Shooter Game
- Pac Man Game
- Challenge App

# Grade 3 and Grade – 4

We are going to learn about Block Coding using scratch and various projects and concepts will be covered like story board, Chatbot, Games like- Fruit catcher game, Shark Attack Game , Flappy Bird.

In this section We will start Learning Electronic Section and components like Resistors, Capacitors, Breadboard, LED, Battery .

Then We will learn about circuit diagrams and make different basics circuits like LED blinking using nE555 IC, Automatic Street light circuit and Traffic Light Circuit.



## Scratch programming

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## BREADBOARD PROJECTS

- Introduction to the course
- Resistors
- Capacitors
- Breadboard
- L.E.D
- Transistors and IC
- Body is a good conductor
- L.E.D blinking
- Water alarm
- Automatic street light
- Police lights circuit
- Clap switch circuit
- Digital dice circuit
- Car using DPDT switches
- Water level indicator circuit
- L.E.D chaser circuit
- School quiz buzzer circuit
- L.E.D chaser circuit
- School quiz buzzer circuit
- Traffic light circuit
- Four siren generator circuit
- Small loudspeaker circuit
- Electronic letter box circuit
- H- bridge motor fan circuit
- Luggage security alarm circuit
- BCD- 7 segment display circuit
- Line following path car
- Servo motor circuit
- Rain alarm circuit
- Four way traffic light circuit
- Fire alarm circuit
- Displaying 0 to 99 on BCD-7 segment circuit
- IR- BCD-7 segment counter circuit
- Automatic irrigation system
- Soil moisture detector circuit
- RF controlled robot car
- Digital stop watch circuit
- Smoke detector circuit



# Grade 5 , 6, 7 and 8

- For these Grade we will start With Electronic Components and Circuits and we will make projects like – Loud Speaker, Line Follower Robot.
- Then we will Start Learning about Arduino that will involve Coding and Robotics and we will learn about various projects like Obstacle Avider Robot , Home Automation System

## Scratch programming

- Introduction to the course | Account making
- Sprites | backdrops | commands
- Events | variables | coordinates systems
- Broadcast events | clone | blocks
- Storyboard
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## BREADBOARD PROJECTS

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- Digital stop watch circuit
- Smoke detector circuit

## Arduino Projects

- Introduction to the course
- Learning about programming
- Learning about output function
- Learning about Input Function
- Learning about variables, data types, data specifier, address
- Learning about Conditional Operators
- Learning about Conditional statements
- Learning About Loops and Its Types
- Learning About Components
- Resistors
- Capacitors
- Breadboard
- L.E.D
- Transistors and IC
- Arduino
- Learning about arduino basics
- Learning about arduino coding steps
- Led blinking Program
- Patterns in LED blinking
- Automatic street light using LDR
- LCD circuit using arduino
- BCD- 7 segments circuit
- Interfacing IR sensor
- Motion Sensor interfacing, burglar alarm
- Flame sensor interfacing
- Ultrasonic sensor interfacing
- Obstacle avoider car
- line following path car
- Automatic hand sanitizer
- Smoke sensor
- Soil sensor
- Bluetooth Module with L.E.D
- Bluetooth Controlled car
- Home automatiobn System
- Automatic plant watering Rover

# Grade – 9,10

- we will Start Learning about Arduino that will involve Coding and Robotics and we will learn about various projects like Obstacle Avoider Robot , Home Automation System.
- Then We will Learn About Programming languages and we will start with Python and we will learn python in detail from basics to advance level.

## Scratch programming

- **Introduction to the course | Account making**
- **Sprites | backdrops | commands**
- **Events | variables | coordinates systems**
- **Broadcast events | clone | blocks**
- **Storyboard**
- **Chatbot**
- **Fruit Catcher Game**
- **Shark Attack Game**
- **Bell Racer Game**
- **Catch The Banana Game**
- **Snake Game**
- **Flappy Parrot Game**
- **Pong Game**
- **Quiz App**
- **Paint App | Basics**
- **Allen Shooter Game**
- **Wizard Soccer Game**
- **Monster Shooter Game**
- **Pac Man Game**
- **Challenge App**

## BREADBOARD PROJECTS

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- Capacitors
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- L.E.D
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- Fire alarm circuit
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- Automatic irrigation system
- Soil moisture detector circuit
- RF controlled robot car
- Digital stop watch circuit
- Smoke detector circuit

## Arduino Projects

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- Learning about programming
- Learning about output function
- Learning about Input Function
- Learning about variables, data types, data specifier, address
- Learning about Conditional Operators
- Learning about Conditional statements
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# Programming and electronics projects for grade-9,10

## C Programming

- **INTRODUCTION OF C PROGRAM** | Library function , syntax , output function
- **DATA TYPES** | Introduction , types of data, data specifiers, Input function Examples of data types
- **DATA TYPES** | Examples of different data types( float , string , character)
- **Conditional operators** | Introduction of conditional operator, types of operator, conditional statement, IF statement
- **Conditional operators** | IF - ELSE Statement , ELSE- IF ELSE Statement
- **Loops** | Introduction of loops , types of loops ,FOR loop, syntax
- **Loops** | While loop , syntax, Do -While loop , syntax
- **Function In C** | Introduction of function, syntax, use of function
- **Function In C** | Functions with arguments | Functions without arguments
- **Arrays** | Introductions of array, types of array, syntax, 1-dimension array
- **Arrays** | 2- Dimension, multi dimensional, Program
- **Break and Continues statement, goto statement**
- **Strings** | Introduction of strings, types of strings, syntax , function used In strings
- **Strings** | library of strings, functions in library function
- **Pointers** | Learn about pointers
- **Structure In C**
- **Unions In C** | Enumerations
- **Booleans** | Special Programs In C
- **File Handling In C**
- **Dice Simulator Game**
- **Doubts & Revision Session**

## C++ Programming

- **Introduction of C++** | First program , comments and end function
- **Data type In C++** | Input function In C++ , Escape sequence and define
- **Program for different data types In C++**
- **Operators In C++** | Conditional operators, If statement, Nested If statement
- **If-Else and If-Else-If statement**
- **Loops In C++** | For loop, program | Do- Loops and Do- while Loop, program
- **Practise for Loops In C++**
- **Control Statements In C++** | Break, Continue and Switch
- **Functions In C++** | With and without arguments
- **Functions Calling In C++**
- **Arrays In C++** | 1D Arrays
- **Arrays In C++** | 2D Arrays
- **Strings In C++**
- **OOPS- Intro** | Classes | Objects
- **Creating Multiple Classes & Multiple Objects**
- **Constructors** | Destructors
- **Data Abstarction** | Encapsulation
- **Inheritance In C++**
- **Polymorphism In C++**
- **File Handling In C++** | Doubts Session

# python Programming



- Introduction to course ,python , history, application
- Installing Atom and python
- Variables and Data types
- Operators In python
- practice programs on operators
- Python Strings
- List , Dictionary , Tuple and Sets
- practice programs on list , sets
- Conditional statements If- else
- practice programs on conditional statements
- loops In python and practice programs
- functions In python (converter programs)
- Dice rolling project
- Dictionary project (Including file and main logic)
- Completing Dictionary project
- Hangman game project
- Hangman project completion
- File Handling In python
- Python Modules
- Numpy
- Pandas
- Matplot
- Working with Images

## PRE REQUISITES TO HAVE IN SCHOOL FOR LAB



300 to 400 sq  
Feet Area



Basic Furniture  
for 30 to 40  
Students



Internet Access  
as per  
requirement



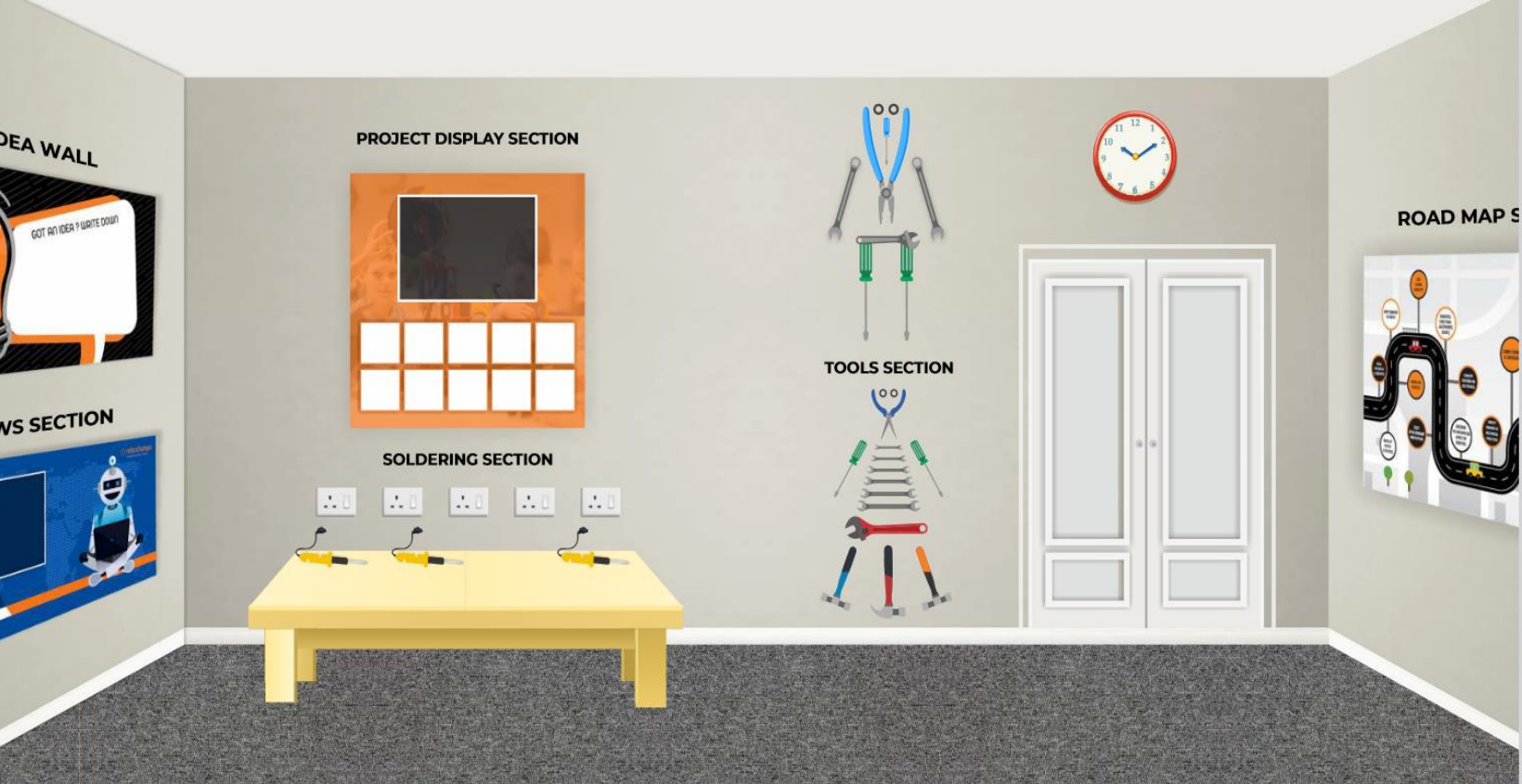
Projectors  
&  
Screens

Wall of Light  
Grey Colour and  
Roof of  
white colour

# LAB LAYOUT



# LAB LAYOUT





## Package P1: Electronics Development, Robotics, IOT & Sensors

SNo.	Components	Detail	Description	Features	Units
1	Microcontroller Board	Arduino UNO	It is a microcontroller based Open Source Development Board that can be used to control motors and take inputs	A USB connection & A power jack 14 I/O pins 6 PWM output & 6 analog inputs	10
2	Microprocessor Board	Raspberry Pi (open source)	It is a microprocessor based Open Source mini-computer that can be used to make various kinds of projects.	Quadcore 64 Bit ARM Cortex A53 Memory 1 GB USB Ports - 4 Video Outputs - HDMI, Composite video	10
3	Breadboards	Breadboards	Solderless 800 points Board	N/A	20
4	Mini Breadboard	Mini Breadboard	Solderless 400 points board	N/A	20
5	General Purpose Board	General Purpose Board (A1)	Generalised form of PCBs that can be used for prototyping	N/A	10
6	General Purpose Board	General Purpose Board (A2)	Generalised form of PCBs that can be used for prototyping	N/A	10
7	General Purpose Board	General Purpose Board (A3)	Generalised form of PCBs that can be used for prototyping	N/A	10
8	16x2 LCD Display	16x2 LCD Display	Controller Character Black on Green with Backlight	N/A	10
9	USB Cables	USB Cables (A to B)	Cable used to burn programs onto the boards	N/A	10
10	Multiple Resistors	Resistor Pack	Different kinds of resistances (1K, 10K, 1M, 220 etc) 100 each	N/A	4
11	Multiple Capacitors	Capacitor Pack	Different kinds of Capacitors (1pF, 1nF, 10uF, 100uF) 100	N/A	4
12	9 Volt Batteries	9 Volt Batteries	DC Batteries used to power up the small circuits	N/A	50
13	IR Sensors	IR sensors	Infra Red Sensors can be used to measure distance and color of an approaching	Infra Red Sensors can be used to measure distance & color of an	20

14	Triple Axis Magnetometer Breakout - HMC5883L	Triple Axis Magnetometer Breakout HMC5883L	This sensor can be used to identify the three dimensional coordinates of a machine	These use the magnetic properties of Earth's core to identify their	8
15	Humidity Sensor	Humidity Sensor	This sensor can be used to measure the temperature and humidity of surroundings.	Its typically found in Air conditioners and home	5
16	MQ-4 Natural Gas sensor	MQ-4 Natural Gas sensor	Its primarily used to identify the presence of Hydrocarbon gases.	Heating systems. Industrial and home appliances to find gas leakage.	10
17	TSOP 1738 (Receiver) & IR Emitter	TSOP 1738 (Receiver) & IR Emitter	Its used as a receiver in IR Remote Control Systems	Typically used in TV and other devices to receive IR from Remotes	10
18	Ultrasonic Sensor Module HC-SR-04	Ultrasonic Sensor Module HC-SR-04	Uses the concepts of SONAR to identify distances from any object.	Used in high speed counting, level detection etc. They can interface with Arduino	10
19	Triple Axis Accelerometer (ADXL335)	Triple Axis Accelerometer (ADXL335)	Used to identify tilt sensing	Used in Phone cameras for image stabilisation	10
20	PIR Motion Detector Module	PIR Motion Detector Module	Can detect motion around it in a 360 degree format	Used as a motion detector in many different	10
21	CMOS IR Camera Module - 728x488	CMOS IR Camera Module - 728x488	Its a camera module that can capture images and pass it onto the brains	Used in Surveillance systems	2
22	RFID Reader - Tag	RFID Reader - Tag	Its a Microchip with an Antenna packaged inside card.	Used in warehouses and various attendance systems	3
23	RF Modules Tx & Rx 315 MHz ASK	RF Modules Tx & Rx 315 MHz ASK	They are used to communicate amongst various electronics devices.	The 2 channel or 4 channel device are used to communicate	10
24	Voice Recognition	Voice Recognition	This module is used for playing back information and automated identification.	They are used for stand alone devices and dealing with spikes in all volumes	1

**Package P1: Electronics Development,  
Robotics, IOT & Sensors**

S.No.	Detail	Product Description		Units
1	Electronics Development	multiple resistors for electronic projects (various sizes)	Consumable	6
2	Electronics Development	capacitors for electronic projects (various sizes)	Consumable	4
3	Electronics Development	IC's - 555, LM358, Flip flop IC	Consumable	3
4	Electronics Development	Magnetic Sensor - read switch	Consumable	30
5	Electronics Development	Relay - 5V	Consumable	15
6	Electronics Development	Transformer - Step down	Consumable	15
7	Electronics Development	Condenser mic	Consumable	15
8	Electronics Development	Pack of diodes	Consumable	100
9	Electronics Development	Pack of transistors - BC547, 2N3904, BC548	Consumable	3
10	Electronics Development	IR Transmitter and Receiver pair	Consumable	30
11	Electronics Development	BMP 180	Consumable	8
12	Electronics Development	DHT 11	Consumable	8
13	Electronics Development	Bluetooth Module	Consumable	8
14	Electronics Development	Zigbee	Consumable	5
15	Electronics Development	Light Sensor	Consumable	10

16	Electronics Development	Flex Sensor	Consumable	5
17	Electronics Development	Wifi Module	Consumable	5
18	Electronics Development	GPS Module	Consumable	5
19	Electronics Development	GPRS Module	Consumable	5
20	Electronics Development	Bigger Buzzer	Consumable	25
21	Electronics Development	Small Buzzer	Consumable	25
22	Electronics Development	0.96 Inch O-LED	Consumable	5
23	Electronics Development	Seven Segment Display	Consumable	30
24	Electronics Development	Water Level Sensor	Consumable	7
25	Electronics Development	Joystick sensor	Consumable	7
26	Electronics Development	Servo Motor	Consumable	10
27	Electronics Development	Potentiometer Big	Consumable	10
28	Electronics Development	DC Motor simple	Consumable	15
29	Electronics Development	Keypad	Consumable	8
30	Electronics Development	Finger Print	Consumable	5
31	Electronics Development	OU7670 Arduino Camera Module	Consumable	5
32	Electronics Development	Raspberry Pi 5mp Camera Board Module	Consumable	5
33	Electronics Development	Drone	Consumable	3 Part

## Package P2: Rapid prototyping tools

SNo.		Material	Description	Units
1	3D Printer Kit and Tools	3D Printer	(Build volume of 180 mm x 200 mm x 160 mm) along with tools or may vary.	1
2	3D Printer Kit and Tools	PLA Filament (for 3D Printer)	1.75 mm PLA printer in four different colors (Black, Blue, White and Red)	5
3	3D Printer Kit and Tools	Tweezers, Spatula, Screw Drivers	For upkeep & maintenance of 3D printer	5

SNo	Smartcircuits	Components	Description	Features	Units
<b>General</b>					
1	DIY Robotics Kit	Chassi	This is used to make a base of a robotics project	This will be used a base for your robotics project	15
<b>Motion System</b>					
2	DIY Robotic	Caster Wheels	Provides free wheel movement to the Robot	Comes with a system to connect within our system	20
3	DIY Robotics Kit	Wheels/Pulleys	These wheels double up as pulleys and have in-built tread to provide requisite friction	Has a hole that can easily let a shaft to pass through both for motors as well as shafts	40
4	DIY Robotics Kit	Motors	200 RPM Motors with a in-built feedback mechanism	Provides the linear movement	40
5	DIY Robotics Kit	Robotic ARM kit	Robotic Arm kit	Robotic Arm kit	2
<b>Electronics System</b>					
6	DIY Robotics Kit	IR sensors	Used to make Line follower robots, touch me not and follow me not robot	N/A	100
7	DIY Robotics Kit	motion Detector sensors	can be used to detect the object in front of it.	N/A	25
8	DIY Robotics Kit	Bluetooth Sensor	Can be used to control robot with Android phone.	N/A	25
9	DIY Robotics Kit	Remote Control	A button based remote used to control robot in wireless state.	N/A	10

## Package P3: Mechanical, Electrical and Measurement Tools

SNo.	Components	Detail	Units
1	Hacksaw	Hacksaw (Junior)	1
2	Mini Hacksaw	Mini Hack Saw	1
3	Micro Chisel Set	Micro Chisel Set	1
4	Pliers	External Straight Nose Circlip Plier	1
5	Pliers	Long Nose Plier	1
6	Pliers	Combination Mini Plier	1
7	Pliers	wire stripping pliers	1
8	Pliers	bent nose pliers	1
9	Pliers	Needle nose pliers	1
10	Ball Pen Hammer	Ball Pen Hammer (100 gm)	1
11	Steel Shaft Claw Hammer	Steel Shaft Claw Hammer	1
12	Fiber Glass Nail	Fiber Glass Nail	1
13	Rubber Mallet	Rubber Mallet	1
14	C-Clamp	C-Clamp	5
15	Allen Key Set	Allen Key Set	1
16	Dremel Workstation for drill	Dremel Workstation for drilling	1
17	12 piece combination Spanner Set	12 piece combination Spanner Set	1
18	12 Piece Open ended Spanner Set	12 Piece Open ended Spanner Set	1
19	30 Piece Ratcheting Screwdriver Set	30 Piece Ratcheting Screwdriver Set	1
20	Baby Vice 60 mm	Baby Vice 60 mm	1

20	Baby Vice 60 mm	Baby Vice 60 mm	1
21	6 Piece Precision Screw Driver Set	6 Piece Precision Screw Driver Set	3
22	Adjustable Spanner	Adjustable Spanner	2
23	Screw Drivers (Multi Purpose)	Screw Drivers (Multi Purpose)	5
24	Tool Sets (Multi Purpose)	Tool Sets (Multi Purpose)	3
25	Hot Glue Gun	Hot Glue Gun	2
26	Glue Sticks	Glue Sticks	50
27	Soldering Iron Kit	Soldering Iron Kit Temperature Controlled (LK 936)	2
28	DC Power Supply	DC Power Supply (0-30 V, 1 Amp, digital DC Power S	3
29	Cables	Micro USB Cable	10
30	Cables	Mini USB Cable	10
31	Cables	USB A to USB B Cable	10
32	Cables	USB to USB Cable	10
33	Adapters	Adapters (5V)	10
34	Adapters	Adapters (10 V)	10
35	Electric Screw Driver Set	Electric Screw Driver Set	1
36	1800 W Dual Temperature Heat Gun	1800 W Dual Temperature Heat Gun	1
37	Stanley Measuring Tape	Stanley STHT30437 5Mx19mm Global Power Return Tape Blister P	2
38	Stainless Steel Ruler	Stainless Steel 12" / 150 mm Ruler	5
39	Digital Vernier Caliper	150 mm / 6" Digital Vernier Caliper	2
40	Spirit Level	12" Spirit Level	2
41	Digital Pen Tester	Digital Pen Tester	1

42	Digital Multi Meter	Digital Multi Meter (Voltage, Current Resistance Seven Functions + nineteen ranges to cover = DC voltage 200 mV to 1kV, AC Voltage 200 V-750 V, DC current microamp 10 amp, Resistance 200-2meg Ohm and Transistor & diode test.	5
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## Package P4 : Construction kits, Power

### Supply,Consumables etc

SNo.	Components	Detail	Units
1	9 volt battery clips	9 volt battery clips	400
2	Hookup Wires (Red & Black Set)	Hookup Wires (Red & Black Set) (In 100 mtr Rolls)	2
3	M-M Jumper Cables	M-M Jumper Cables	400
4	M-F Jumper Cables	M-F Jumper Cables	100
5	F-F Jumper Cables	F-F Jumper Cables	100
6	Power Strip for power adaptors	Power Strip for power adaptors	10
7	Standard first aid kit	Standard first aid kit	1
8	Fire extinguisher (handy units)	Fire extinguisher (handy units)	2
9	Safety Goggles (for every student)	Safety Goggles (for every student)	10
10	Safety Gloves	Safety Gloves	10

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# Let's Revolutionise Together

20  
23