

# Cloud based Digital Blended Learning

Powered by

## Virtual Innovation Lab

## + Free Hardware



**STEM Robotics Design And Prototyping  
Tinkering and Innovation**

**Eligibility: All Branches BTech (I-IV) Years.**

**Duration: 30 Hrs Instructor Led Training.**

## Why EdgeFX Innovation and Tinkering Labs?

EdgeFX is embarking on the 4th Industrial revolution to help students, academia, government and policy makers alike to ride the wave. Our solutions provide platforms for teachers and students to improve teaching, learning and research competence and develop 21st century skills like problem solving, innovation, collaboration, leadership and practical skills.

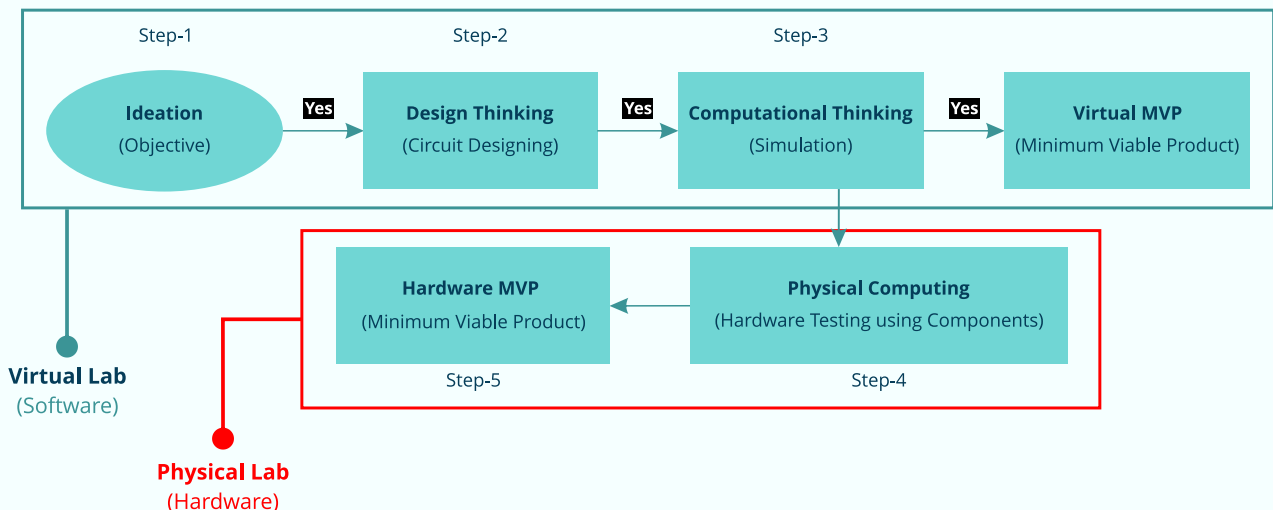
### About

EdgeFX STEM Lab are based on electronic building blocks, designed for easy use and to feed the curiosity of young minds. Each Block has a defined function. Blocks are in different colors and have Block IDs and polarities on them so that you can easily identify and properly mount them on the base. Blocks are grouped into four different categories like Power, Input, Output and Accessories which are color-coded by function. Build 11+ Projects With Reusable Modules Including Basic Components, Sensors, Inputs, Outputs, Wires, Connectors And Breadboard With Detailed Project Manual And Audio-visuals. EdgeFX STEM Lab come with complete documentation including Assembly Procedure and Trouble shooting and extensive project documentation with physical diagrams, project image and circuit diagram with explanation. The projects include real time examples with fun-filled activities and experiments, to kindle your curiosity. These Labs are also mapped to the curriculum.

### Objective

1. To help students learn the fundamentals of STEM Electronics/Ardiono Programming/Robotics and innovate thereafter.
2. Ideation, Design Thinking, Computational Thinking, Physical Computing, Minimum Viable Product including Circuit Design, Circuit Building, Simulation and Coding.

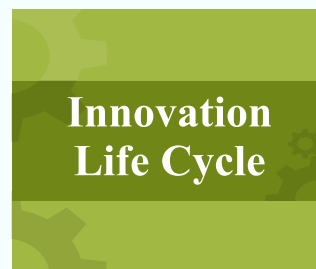
## Idea to Prototyping Flow Chart



## STEM Robotics

Topic	Course Outline
1	To build a bot which moves in the Left direction on pressing the Push Button Switch.
2	To build a bot which moves in the Left and Right directions on pressing the respective Push Button Switches.
3	To build a bot which moves in the Left, Right and Forward directions on pressing the respective Push Button Switches.
4	To build a bot which moves in the Left, Right, Forward and Reverse directions on pressing the respective Push Button Switches.
5	To build a bot which moves in the Left, Right, Forward and Reverse directions on activating the respective Slide Switches, by moving the slider to your right.
6	To build a bot which moves in the Left, Right, Forward and Reverse directions on activating the respective Reed Switches with a magnet.
7	To build a bot which moves in the Left direction using human touch as input.
8	To build a bot which moves in the Left and Right directions on holding the respective Touch points
9	To build a bot which moves in the Left, Right and Forward directions on holding the respective Touch Points
10	To build a bot which moves in the Left, Right, Forward and Reverse directions on holding the respective Touch Points.
11	To build a bot which moves in the Left, Right, Forward and Reverse directions on activating four different inputs Reed Switch, Touch Point, Push Button Switch and Slide Switch respectively.

### Complimentary Courses Industry 4.0 and Innovation life cycle



### Complementary Hardware

S.No.	Product Name	Number of Kits
1	DIY STEM Tinkering Kit Robotics	10

#### Robotic



**1. DIY STEM Tinkering Kit Robotics Design And Prototyping - Build Multiple Real Time Robots And Remotes, In A One Of Its Kind Arrangement Using Reusable Modules Including Basic Components, Inputs, Outputs, Wires, Connectors, Electrical And Mechanical Accessories And Breadboard With Detailed Project Manual And Audio-visuals.**

## Hardware Specifications

### Hardware Technical Specifications:

- a. Material: Double sided PTH glass epoxy PCB for each module.
- b. Each discrete component duly mounted on micro PCBs forming a functional module, with breadboard compatible male pins for easy reuse with desired items such as resistors, capacitors, switches, transistors to play around basic circuits etc.
- c. Each category of modules to have different color for easy identification such as input modules, output modules, accessories etc.
- d. Power supply module to accept 5V DC from any charger of smart cell phone.
- e. Breadboard: One 840 points type breadboard having 2 horizontal set of lines both at top and bottom for feeding power. Also having 64 in (5x2) section vertical lines for developing any electronic circuit to be wired together with jumper wires and the building blocks.
- f. Robotics Boards: The robotic board to have all the electro- mechanical items like motors and clamps to be mounted on the same PCB accommodating the control electronics preferably in SMD.

### List of Material:

1. Transmitter Unit Module 1 No's
2. Receiver Unit Module 1 No's
3. Diode Module 2 No's
4. L Clamps Module 2 No's
5. Wheels Module 2 No's
6. Geared Motor: (6V, 60rpm) Module 2 No's
7. Screw and Nuts Module 6 No's
8. Matching Jumper 8 No's
9. Jumper Wires "As per Requirement"
10. Connector Module 5 No's
11. Push Button Switch Module 4 No's
12. Slide Switch Module 4 No's
13. Reed Sensor Module 4 No's
14. Touch Point Module 4 No's
15. BC 547 NPN Transistor Module 8 No's
16. Breadboard 1 No's
17. Project Guide Book 1 No's

### Project Guide Specification:

- a. Detailed documentation booklet covering all modules offered
  - b. Circuit Diagram: Complete circuit diagram suggested for beginners with its full explanations of the modules used.
  - c. Fritzing Diagram: Detailed Fritzing diagram with rows and columns duly numbered for mounting each module on the breadboard.
  - d. Physical Image: Exact physical image of the breadboard containing the building blocks and jumper wire as per the circuit.
  - e. Function: Each module to have explanations on its function in relation to the circuit diagram.
  - f. Self explained program codes wherever applicable
  - g. Assembly and Troubleshooting document
  - h. Possible Activities and experiments details
- I Audio Visual explanation on clearly understanding the breadboard, assembly and its use and explaining different concepts. (Refer Annexure 2 for list of Innovations.)

**Relevant Software and Firmware to be supplied along with the product.**

### **Virtual Lab Video Link**

<https://youtu.be/oMK9NS7qnVk>

### **Hardware Kit Video Link**

<https://youtu.be/njoifyMpS2Q>



**Real-time Circuit Design, Coding and Simulation**



**Blending Learning with Instructed led Sessions**



**Assignment & Project Included**



**Realtime working video presentation of exact hardware, besides simulation.**