Cloud based Digital Blended Learning

Powered by

Virtual Innovation Lab

Combination Programs

STEM Electronics, Arduino Programming Design And Prototyping Tinkering and Innovation

EDGEFX TECHNOLOGIES

www.edgefxtech.com

EdgeFX Technologies Pvt. Ltd.
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Eligibility: All Branches BTech (I-IV) Years.

Why EdgeFX Innovation and Tinkering Labs?

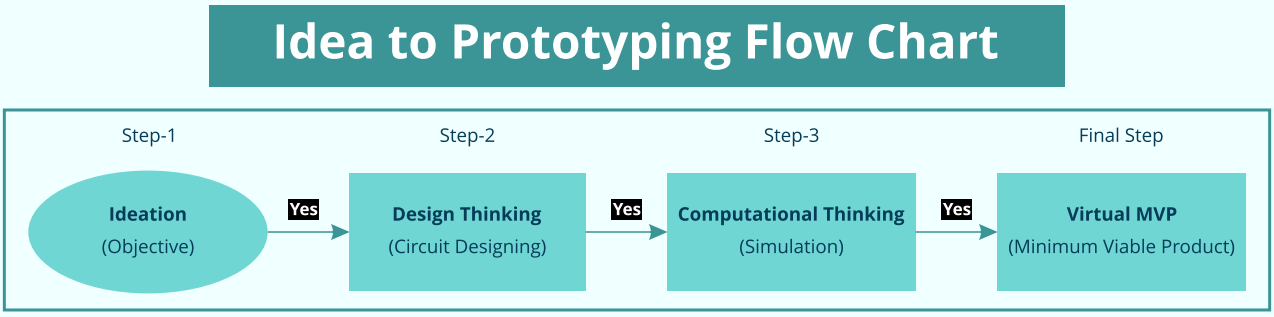
EdgeFX is embarking on the 4th Industrial revolution to help students, academia, government and policy makers alike to ride the wave. Our solutions provide platforms for teachers and students to improve teaching, learning and research competence and develop 21st century skills like problem solving, innovation, 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 75+ 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 and innovate thereafter.
2. Ideation, Design Thinking, Computational Thinking, Physical Computing, Minimum Viable Product including Circuit Design, Circuit Building, Simulation and Coding.



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STEM Electronics

Topic	Course Outline
1	To demonstrate the concept of open and closed circuits.
2	To demonstrate the Push Button Switch, Buzzer function and how electricity is used to generate sound.
3	To demonstrate the LED function and how electricity is used to light up an LED.
4	To demonstrate how LED's like one-way valves let electricity flow only in one direction.
5	To demonstrate conductor and insulator of electricity.
6	To demonstrate the use of fuse to make electrical circuits safer.
7	To demonstrate the function of a Resistor in series with a Buzzer.
8	To demonstrate how a series Resistor is used to protect an LED.
9	To demonstrate how electric circuits can be build to turn on multiple loads at a time without affecting the performance of the other load.
10	To demonstrate the use of electronically controlled switches like Transistors using Push Button Switch for Input and Buzzer for Output.
11	To demonstrate how transistor as a switch can control an LED output.
12	Get creative with circuits, demonstration of Push Button Switch in reverse function with Buzzer for Output.
13	To try and see for your self if the switch is reverse function works for an LED output.
14	To demonstrate if human body is a good conductor of electricity using human touch as Input and Buzzer as Output.
15	To demonstrate the amplification of current via darlington Transistor with LED as Output.
16	To demonstrate the function of a DC Motor and how electrical energy is converted into mechanical energy using a DC Motor.
17	To demonstrate the use of fuse to make electrical circuits safer with a Motor Output.
18	To demonstrate how electricity is converted into Sound, Light and Mechanical energy at the same time.
19	To demonstrate the characteristics of voltage, current, and resistance in a parallel circuit.
20	To demonstrate the characteristics of voltage, current, and resistance in a parallel circuit.
21	To demonstrate the use of a free wheeling diode alongside the DC Motor in the DC Motor Block LU4.
22	To demonstrate the use of a capacitor along side the DC Motor in the DC Motor Block LU4.
23	To demonstrate This OR That logic using Inputs as Push Button Switches and Output as Buzzer.
24	To demonstrate This OR That logic using Inputs as Push Button Switches and Output as DC Motor.
25	To demonstrate This OR That logic using Inputs as Push Button Switches and Output as LED.
26	To demonstrate This AND That logic using Inputs as Push Button Switches and Output as Buzzer.
27	To demonstrate This AND That logic using Inputs as Push Button Switches and Output as DC Motor.
28	To demonstrate This AND That logic using Inputs as Push Button Switches and Output as LED.
29	To demonstrate the Dual LED function.
30	To demonstrate the RGB LED function.
31	To demonstrate the concept of open and closed circuits.
32	To reiterate the Darlington Transistor concept with DC Motor as Output.
33	To demonstrate the amplification of current via darlington Transistor with Flashing LED as Output.
34	To demonstrate the function of Resistor 1K with a Dual LED Output.

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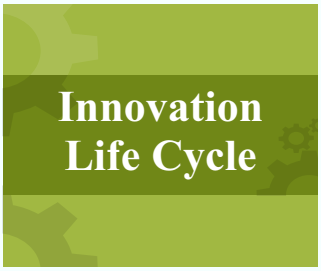
35	To demonstrate the working of a Reed Sensor with Buzzer Output.
36	To demonstrate the working of a Reed Sensor with DC Motor Output.
37	To demonstrate the working of a Reed Sensor Z9 with an LED Output.
38	To demonstrate the working of a Reed Sensor Z9 with a Flashing LED Output.
39	To demonstrate the working of a Reed Sensor Z9 with a Dual LED Output.
40	To demonstrate the working of an LDR Sensor, Resistor 10K and Transistor BC 557.
41	To demonstrate the working of an LDR Sensor with a Fan Output.
42	To demonstrate the working of an LDR Sensor with an LED Output.
43	To demonstrate the working of an LDR Sensor with a Flashing LED.
44	To demonstrate the working of an LDR Sensor with a Dual LED.
45	To demonstrate the function of a Slide Switch.
46	To demonstrate how electric energy is converted into mechanical energy with the use of a another Input Block.
47	To demonstrate how electric energy is converted into sound energy with the use of a another Input Block.
48	To study different LED Outputs.
49	To demonstrate the Output using an Dual LED, when there is a change in the Input.
50	To demonstrate the Output using an RGB LED, when there is a change in the Input.
51	To demonstrate the use of electronically controlled switches like Transistors using Push Button Switch for Input and Flashing LED for Output.
52	To demonstrate the use of electronically controlled switches like Transistors using Slide Switch for Input and Buzzer for Output.
53	To demonstrate the use of electronically controlled switches like Transistors using Slide Switch for Input and DC Motor for Output.
54	To demonstrate the use of electronically controlled switches like Transistors using Slide Switch for Input and LED for Output.
55	To demonstrate the use of electronically controlled switches like Transistors using Slide Switch for Input and Flashing LED for Output.
56	Demonstration of Push Button Switch in reverse function with Flashing LED for Output.
57	Demonstration of Slide Switch in reverse function with Buzzer for Output.
58	Demonstration of Slide Switch in reverse function with DC Motor for Output.
59	Demonstration of Slide Switch in reverse function with LED for Output.
60	Demonstration of Slide Switch in reverse function with Flashing LED for Output.
61	To demonstrate This OR That logic using Inputs as Push Button Switches and Output as Flashing LED.
62	To demonstrate This OR That logic using Inputs as Slide Switches and Output as Buzzer.
63	To demonstrate This OR That logic using Inputs as Slide Switches and Output as DC Motor.
64	To demonstrate This OR That logic using Inputs as Slide Switches and Output as LED.
65	To demonstrate This OR That logic using Inputs as Slide Switches and Output as Flashing LED.
66	To demonstrate This OR That logic using Inputs as Push Button Switch and Slide Switch and Output as Flashing LED.
67	To demonstrate This AND That logic using Inputs as Push Button Switches and Output as Flashing LED.
68	To demonstrate This AND That logic using Inputs as Slide Switches and Output as Buzzer.
69	To demonstrate This AND That logic using Inputs as Slide Switches and Output as DC Motor.

70	To demonstrate This AND That logic using Inputs as Slide Switches and Output as LED.
71	To demonstrate This AND That logic using Inputs as Slide Switches and Output as Flashing LED.
72	To demonstrate This AND That logic using Inputs as Push Button Switch and Slide Switch and Output as Flashing LED.
73	To demonstrate a Latching circuit with Buzzer as the Output.
74	To demonstrate a Latching Circuit with DC Motor as the Output.
75	To demonstrate a Latching Circuit with LED as the Output.

STEM Arduino Programming

Topic	Course Outline
1	Power the Arduino Nano
2	To demonstrate the Push Button Switch, Buzzer and generate sound with Arduino Sketch
3	To generate Red flashing light
4	To generate Green flashing light
5	To generate Blue flashing light
6	To generate secondary color Yellow with the sum of two primary colors Red and Green
7	To generate secondary color Magenta with the sum of two primary colors Red and Blue
8	To generate secondary color Cyan with the sum of two primary colors Green and Blue
9	To generate White light with the sum of three primary colors Red, Green and Blue
10	To generate the final output. i.e. To generate a rainbow of colors, each with a unique Buzzer Sound.

Complimentary Courses Industry 4.0 and Innovation life cycle



Virtual Lab Video Link

https://www.youtube.com/watch?v=wi7USGVCWA8&t=7s
https://www.youtube.com/watch?v=0ESXlcq53Xo&t=88s

- **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.**

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