

**Smart Cities Automation Hardware, Design, Prototyping and Innovation Development  
with real-time examples and Practicals  
Interdisciplinary Program  
Powered by Virtual Innovation Lab  
(In conformance with UN SDG)**

**Eligibility: EEE, CSE, ME, CE BTech (I-IV) Years. Instructor Led Training.**

Objective: The world is embarking on the 4th Industrial revolution. We need solutions and 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.

Course Outline: Smart Cities Automation Hardware, Design and Prototyping Innovation Development interdisciplinary program Enables Multiple Guided and Open Innovations. Innovative technology bringing advanced level hands-on engineering challenges for colleges/universities. Conceptualization to Finalization stage including Abstract, Block diagram, Circuit building and Simulation through Proteus, Coding, Simulation of a working prototype.

Outcome: 1.Help students with project based learning, innovation and prototyping from basic to advanced level in Smart Cities including Embedded Systems, Communications, Sensors, Advanced IOT, Automation and build working virtual/hardware prototypes.  
2. Ideation, Design Thinking, Computational Thinking, Physical Computing, Minimum Viable Product including Circuit Design, Circuit Building, Simulation and Coding.

S.No.	List of Practicals
<b>A</b>	<b>IR sensors fed to programmed microcontroller/Arduino for Zone wise Density based Traffic Signal System both in time sequence &amp; Remote Override features of Traffic Signal in Emergency including smart parking Parking Allotment with Display</b>
1	Density based Traffic Signal System using 8051 Controller
2	Arduino based Density based Traffic Signal System
3	IOT based Density based Traffic Signal System using 8051 Controller
4	Arduino and IOT based Density based Traffic Signal System
5	Remote Override of Traffic Signal in Emergency using 8051 Controller
6	Arduino based Remote Override of Traffic Signal in Emergency
7	Bluetooth based Remote Override of Traffic Signal in Emergency using 8051 Controller
8	Arduino and Bluetooth based Remote Override of Traffic Signal in Emergency
9	Parking Allotment with Display using 8051 Controller
10	Arduino based Parking Allotment with Display
11	IOT based Parking Allotment with Display using 8051 Controller
12	Arduino and IOT based Parking Allotment with Display
<b>B</b>	<b>Microcontroller/Arduino based Load Control System by zero voltage triggered through opto isolators SCR/TRIAC/Relay using Communication links over GSM/RF/Bluetooth/DTMF/TV Remote/PC/ IoT/Keypad/Voice/Push Button with Induction Motor/Bulb</b>
1	GSM based Load Control System using 8051 Controller with SCR
2	Arduino and GSM based Load Control System with SCR
3	GSM based Load Control System using 8051 Controller with TRIAC

4	Arduino and GSM based Load Control System with TRIAC
5	GSM based Load Control System using 8051 Controller with Relay
6	Arduino and GSM based Load Control System with Relay
7	RF based Load Control System using 8051 Controller with SCR
8	Arduino and RF based Load Control System with SCR
9	RF based Load Control System using 8051 Controller with TRIAC
10	Arduino and RF based Load Control System with TRIAC
11	RF based Load Control System using 8051 Controller with Relay
12	Arduino and RF based Load Control System with Relay
13	Bluetooth based Load Control System using 8051 Controller with SCR
14	Arduino and Bluetooth based Load Control System with SCR
15	Bluetooth based Load Control System using 8051 Controller with TRIAC
16	Arduino and Bluetooth based Load Control System with TRIAC
17	Bluetooth based Load Control System using 8051 Controller with Relay
18	Arduino and Bluetooth based Load Control System with Relay
19	DTMF based Load Control System using 8051 Controller with SCR
20	Arduino and DTMF based Load Control System with SCR
21	DTMF based Load Control System using 8051 Controller with TRIAC
22	Arduino and DTMF based Load Control System with TRIAC
23	DTMF based Load Control System using 8051 Controller with Relay
24	Arduino and DTMF based Load Control System with Relay
25	TV Remote based Load Control System using 8051 Controller with SCR
26	Arduino and TV Remote based Load Control System with SCR
27	TV Remote based Load Control System using 8051 Controller with TRIAC
28	Arduino and TV Remote based Load Control System with TRIAC
29	TV Remote based Load Control System using 8051 Controller with Relay
30	Arduino and TV Remote based Load Control System with Relay
31	PC based Load Control System using 8051 Controller with SCR
32	Arduino and PC based Load Control System with SCR
33	PC based Load Control System using 8051 Controller with TRIAC
34	Arduino and PC based Load Control System with TRIAC
35	PC based Load Control System using 8051 Controller with Relay
36	Arduino and PC based Load Control System with Relay
37	Load Control System using 8051 Controller with SCR and push button
38	Arduino based Load Control System with SCR and push button
39	Load Control System using 8051 Controller with TRIAC and push button
40	Arduino based Load Control System with TRIAC and push button

41	Load Control System using 8051 Controller with Relay and push button
42	Arduino based Load Control System with Relay and push button
43	Load Control System using 8051 Controller with SCR and Keypad
44	Arduino based Load Control System with SCR and Keypad
45	Load Control System using 8051 Controller with TRIAC and Keypad
46	Arduino based Load Control System with TRIAC and keypad
47	Load Control System using 8051 Controller with Relay and keypad
48	Arduino based Load Control System with Relay and keypad
49	IOT based Load Control System using 8051 Controller with SCR
50	Arduino and IOT based Load Control System with SCR
51	IOT based Load Control System using 8051 Controller with TRIAC
52	Arduino and IOT based Load Control System with TRIAC
53	IOT based Load Control System using 8051 Controller with Relay
54	Arduino and IOT based Load Control System with Relay
55	Voice and Bluetooth based Load Control System using 8051 Controller with SCR
56	Arduino, Voice and Bluetooth based Load Control System with SCR
57	Voice and Bluetooth based Load Control System using 8051 Controller with TRIAC
58	Arduino, Voice and Bluetooth based Load Control System with TRIAC
59	Voice and Bluetooth based Load Control System using 8051 Controller with Relay
60	Voice and Bluetooth based Load Control System using 8051 Controller with Relay
<b>C</b>	<b>Microcontroller/Arduino based Optimum Energy Management System /Object/ Visitor Counter Display / Overload Alarm Warning System by zero voltage triggered through opto isolators SCR/TRIAC/Relay</b>
1	Optimum Energy Management System using 8051 Controller with SCR and 7 segment display
2	Optimum Energy Management System using 8051 Controller with TRIAC and 7 segment display
3	Optimum Energy Management System using 8051 Controller with Relay and 7 segment display
4	Arduino based Optimum Energy Management System with SCR and 7 segment display
5	Arduino based Optimum Energy Management System with TRIAC and 7 segment display
6	Arduino based Optimum Energy Management System with Relay and 7 segment display
7	Optimum Energy Management System using 8051 Controller with SCR and LCD display
8	Optimum Energy Management System using 8051 Controller with TRIAC and LCD display
9	Optimum Energy Management System using 8051 Controller with Relay and LCD display
10	Arduino based Optimum Energy Management System with SCR and LCD display
11	Arduino based Optimum Energy Management System with TRIAC and LCD display
12	Arduino based Optimum Energy Management System with Relay and LCD display
13	Object/ Visitor Counter Display using 8051 Controller with 7 segment display
14	Arduino based Object/ Visitor Counter Display with 7 segment display

15	Object/ Visitor Counter Display using 8051 Controller with LCD display
16	Arduino based Object/ Visitor Counter Display with LCD display
17	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with SCR and 7 segment display
18	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with TRIAC and 7 segment display
19	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with Relay and 7 segment display
20	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with SCR and 7 segment display
21	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with TRIAC and 7 segment display
22	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with Relay and 7 segment display
23	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with SCR and LCD display
24	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with TRIAC and LCD display
25	Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication using 8051 Controller with Relay and LCD display
26	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with SCR and LCD display
27	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with TRIAC and LCD display
28	Arduino based Overload Alarm Warning System in a Passenger Lift with Number of Occupants Indication with Relay and LCD display