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Criterion VII – Institutional Values and Best Practices

7.1.2. The Institution has facilities for alternate sources of energy and energy conservation measures

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7.1.2 The Institution has facilities for alternate sources of energy and energy conservation measures

1. Solar power plant

MSEC installed an off grid 15 kW Photovoltaic (PV) system as a part of a grand initiated by the Ministry of New and Renewable Energy (MNRE) for renewable power source with solar power generation.

The PV system installed has three types of solar panels, namely, Monocrystalline (5kW), Polycrystalline (5kW) and thin film (5kW). We generated an exhaustive database of solar panels at varying operational conditions and supplying various types of loads at one site. These data lead us to the development of a useful process model of solar energy utilization and the same was implemented in the project.

The installed PolyCrystalline PV of 5 kW, feed energy to the loads connected in the classrooms located in the third floor of the Civil Engineering Block. This plant has been built with the approval of MNRE at a total cost of Rs. 23.51 lakhs and funded partially by GOVT. OF INDIA/MNRE/NEW DELHI. Institution has received Rs. 7,12,800 as CENTRAL FINANCIAL AID (CFA).

The Cross Functional Research Team (CFRT) of MSEC had proposed a Load Management Scheme for this 3 x 5 kW Photovoltaic system. The main objective of designing this Load Management system is to 'track' the generation and optimize Generation with respect to Load. The College Management has released a sum of Rs. 25,000 /- as initial installment to the CFRT in developing the Open Loop System.

Data on the energy produced by Poly and Mono crystalline Solar PV systems, each of 5kW nominal capacity, was examined. From Table I we observe that 4600 units were generated (fifteen-month period). Rs. 20000/- per annum is saved in electricity by the two PV systems.

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Table I - the *energy meter readings* recorded during Feb'14 and May'15 by the Poly and Mono PV systems. The Poly unit supplies lights and fans in six class rooms. The Mono supplies the SoM laboratory in Civil Block.

Date	Poly: Generated Units	Mono: Generated Units
Feb 14, 2014	441	68
Mar 1, 2014	542	293
Apr 1, 2014	780	0
May 2, 2014	1025	539
Jun 18, 2014	1173	642
Jul 2, 2014	1236	870
Aug 1, 2014	1296	903
Sep 2, 2014	1491	0
Oct 13, 2014	1691	1261
Nov 4, 2014	1766	1374
Dec 2, 2014	1802	1441
Jan 2, 2015	1892	1595
Feb 2, 2015	2040	1864
Feb 27, 2015	2126	2133
Apr 2, 2015	2337	2453
May 1, 2015	2427	2683
Total in 15 months	**1986**	**2615**
Money equivalent	Rs. 9930	Rs. 13075

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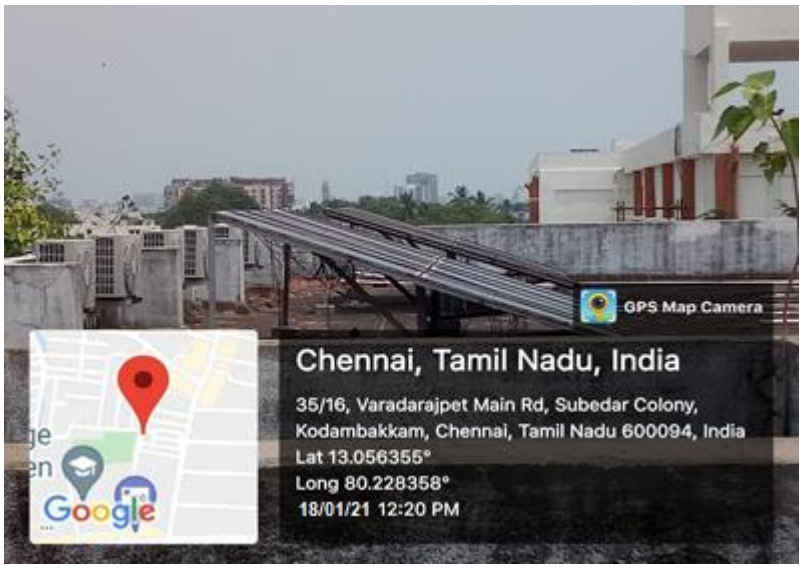

Figure 1. Installed solar panels in Sri Vidhushekhara Bharathi Block (civil block)

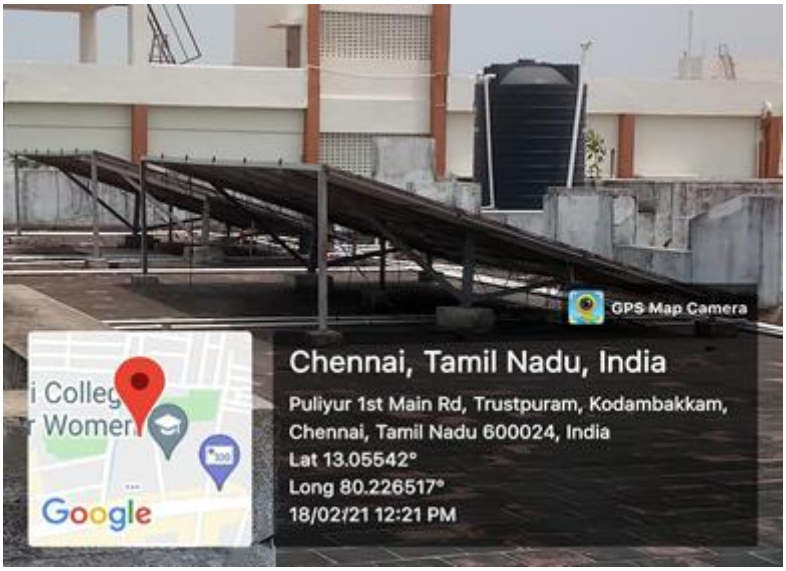

Figure 2. Installed solar panels in Sri Vidhushekhara Bharathi Block (civil block)

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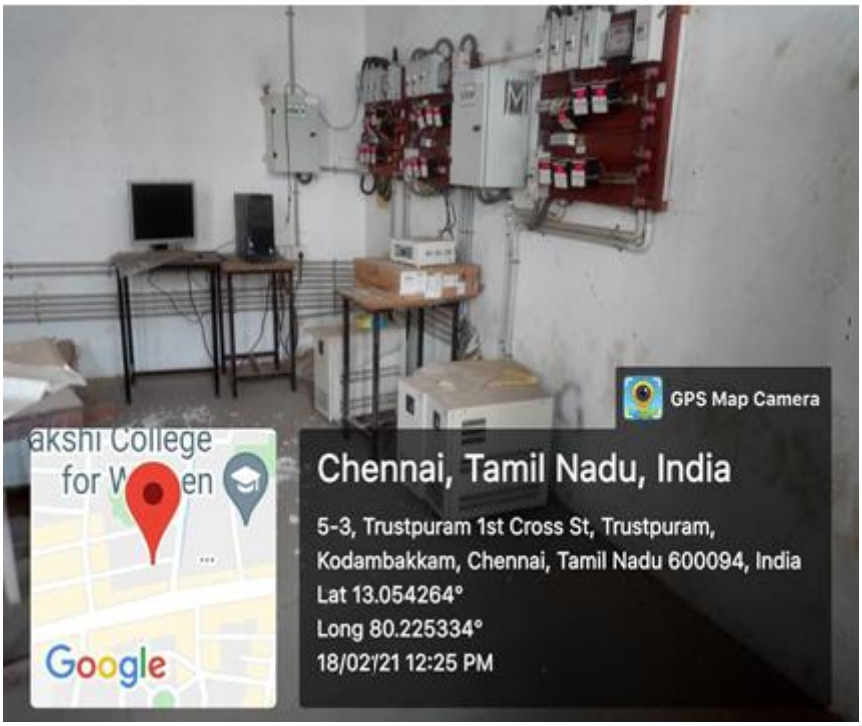

Figure 3. Load management system

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7.1.2 LED BULBS

To reduce the harmful effects of conventional lamps and to save the energy, Ministry of New and Renewable Energy (MNRE) insist the educational institutions to switch from conventional lamps to light emitting diode (LED) and compact fluorescent lamp.

LED lights can reduce energy consumption because it has much lower power level and less maintenance cost. Since LED bulbs emit low heat, they are much safer for environment than conventional incandescent lamps.

Table 1. Common lighting loads installed in each department

S. No.	Area installed	Fluorescent Lamp (FL) (36 watt)	Compact Fluorescent Lamp (CFL) (20 watt)	LED (36 watt)
Main building block				
KRS seminar hall				
1	KRS seminar hall	0	42	21
CSE				
1	Lab 1 & 2	0	21	18
2	Project and research lab	0	21	18
3	Lab 6	0	10	8
4	Lab 7	0	12	8
5	Lab 8	0	12	10
ECE				
6	Lab 1 & 2	20	0	0
7	Lab 3 & 4	34	0	0
8	Simulation lab	0	24	18
9	Digital signal processing and microprocessor lab	0	24	19
CSE & ECE SEMINAR HALL				

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10	Seminar hall	0	18	21
EEE				
11	Lab 1 & 2 (Electrical machines lab 1&2)	72	0	0
12	Lab 3, 4 & 5	31	0	0
13	Lab 7 (Power Electronics lab)	28	0	0
14	Lab 8 (Power System Simulation lab)	28	1	0
IT				
15	Lab 1 to 6	0	72	54
Mechanical & Civil building block				
MECHANICAL				
16	CAD lab	0	36	0
17	Lab 3, 4, 5 (28 watt FL)	42	0	0
CIVIL				
18	CAD lab (First floor)	0	20	0
19	Lab 1, 2, 3 (SM Lab - Ground floor)	30	0	0
20	Lab 4	8	0	0
21	Lab 5	48	0	0
22	Soil lab	8	0	0

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23	Lab 7 (Geology lab - First floor)	8	0	0
24	Lab 8, 9 (Environment lab)	24	0	0
25	Lab 11	17	0	0
IIET building block				
26	Chemistry lab (Ground floor)	16	0	0
27	Physics lab (First floor)	10	0	0
28	Communication lab (Second floor)	6	0	0
Total		**430**	**271**	**174**

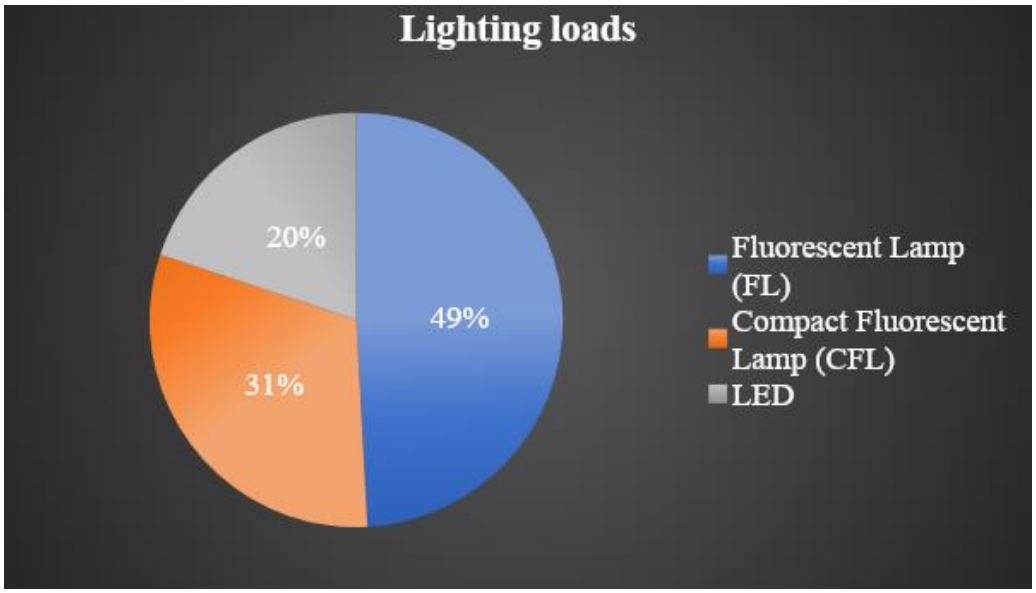

Figure. 1

Details of light loads in our campus:

Total Power requirement for **174 LED** Lights = **6264** kWhr

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$$\frac{\%of annuallightingpowerrequirementthroughLEDbulbs}{Annuallightingpowerrequirementmetthrough LEDbulbs} \times 100$$
$$Annuallightingpowerrequirement$$

Table 2. Amount of Power consumption through LED

Year	Fluorescent lamps (36 watt) (a)	CFL (20 watt) (b)	LED Lights (36 watt) (c)	Total No. of Lights (d)	Annual lighting power requirement for LED Lights (e)	Total power (Annual lighting power requirement) (f)	% of annual lighting power requirement through LED bulbs (e)/(f)
2015	270	0	0	270	0	9720	0
2016	270	0	0	270	0	9720	0
2017	270	0	0	270	0	9720	0
2018	430	271	174	875	6264	27164	23.06
2019	430	271	174	875	6264	27164	23.06
2020	430	271	174	875	6264	27164	23.06

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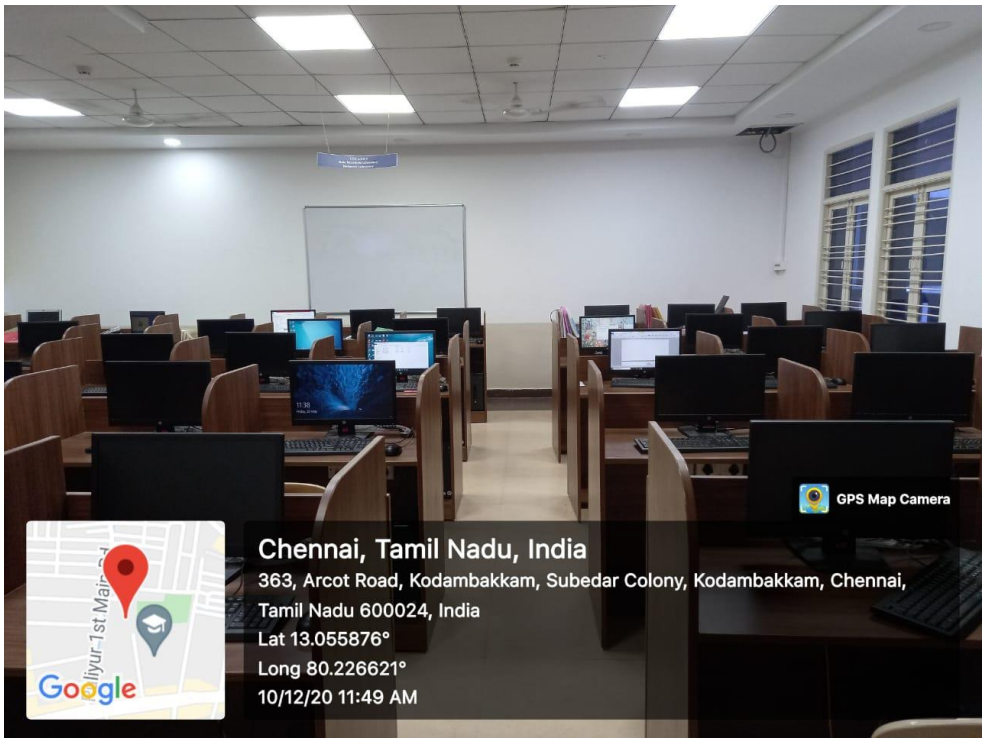

Figure 2. CSE LAB 1

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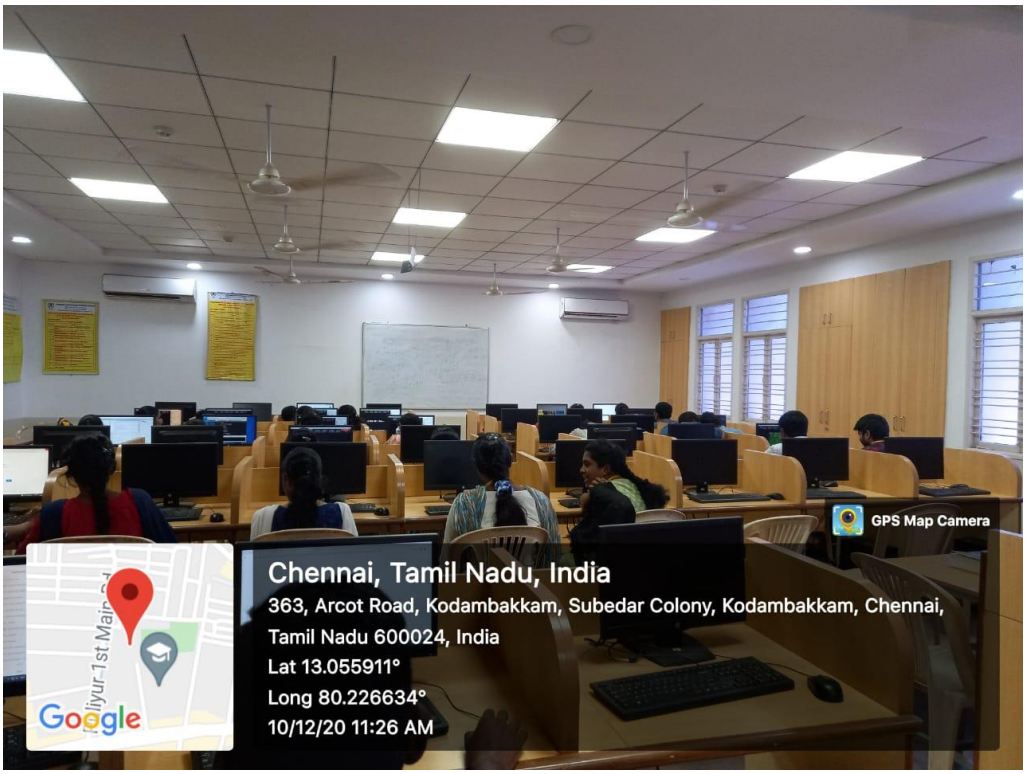

Figure 3. CSE LAB 2

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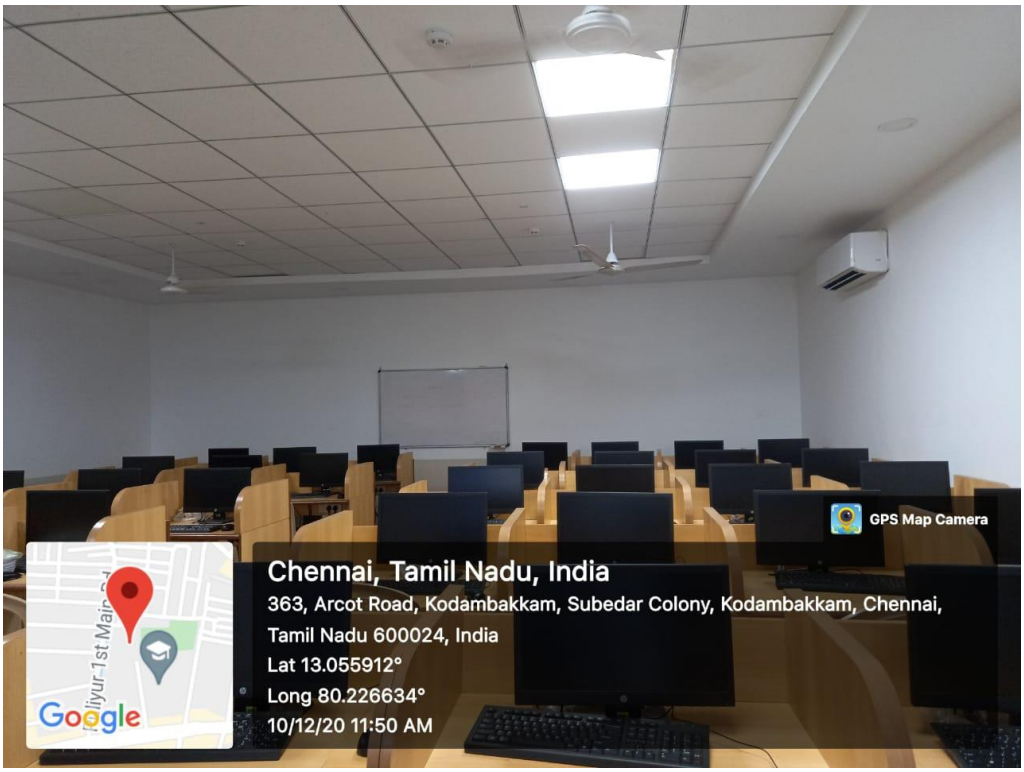

Figure 4. CSE LAB 8

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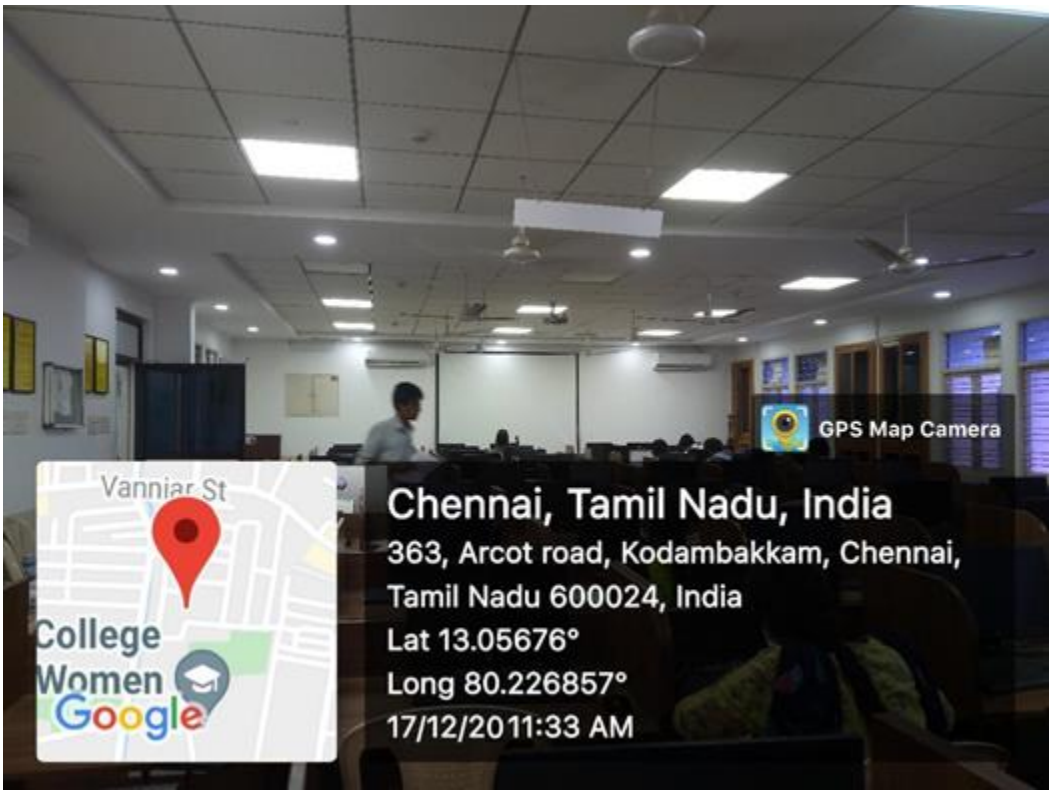

Figure 6. CSE LAB 6

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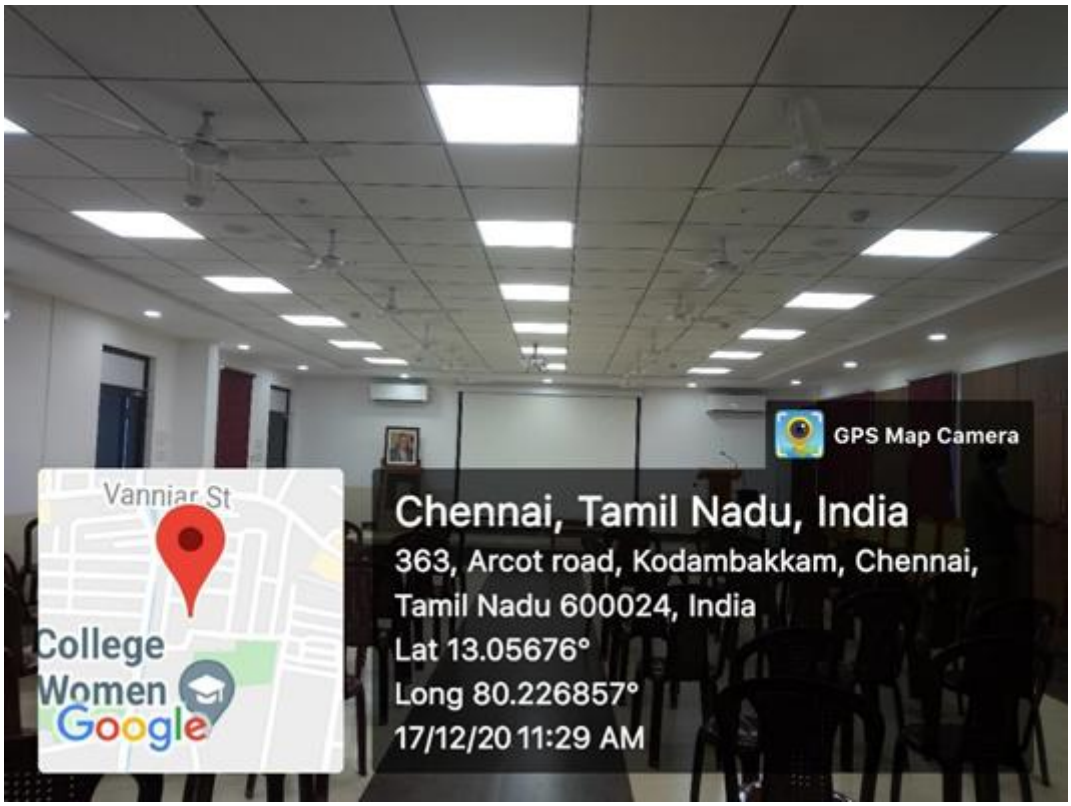

Figure 7. SEMINAR HALL (ECE)

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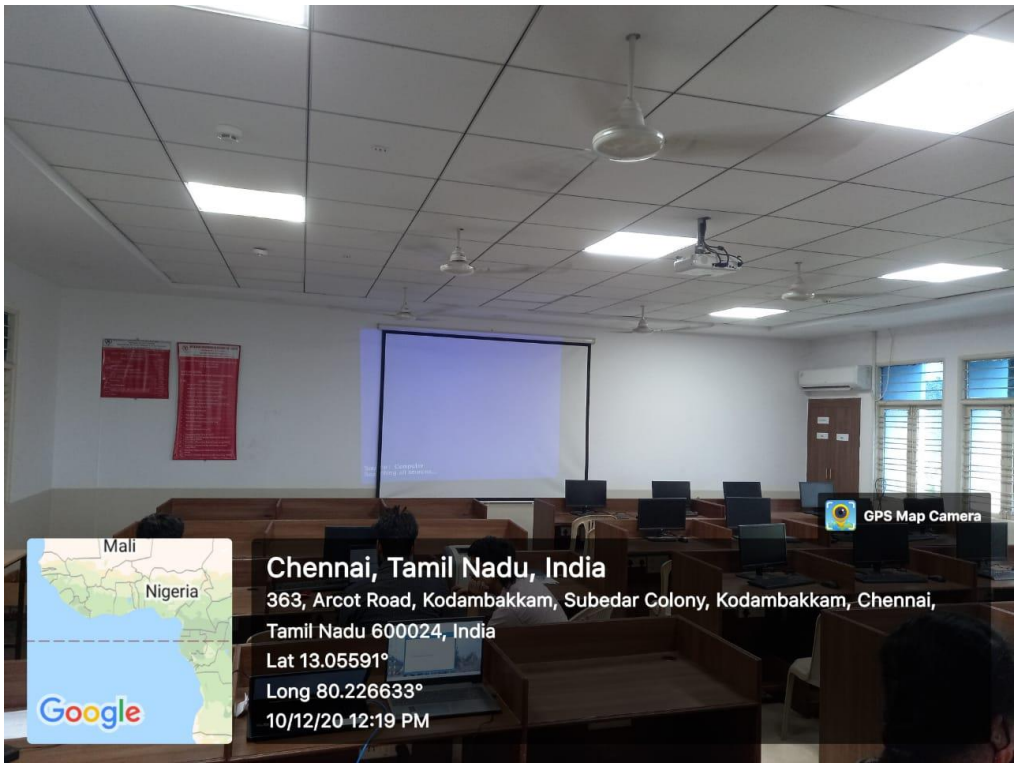

Figure 8. SIMULATION LAB (ECE)

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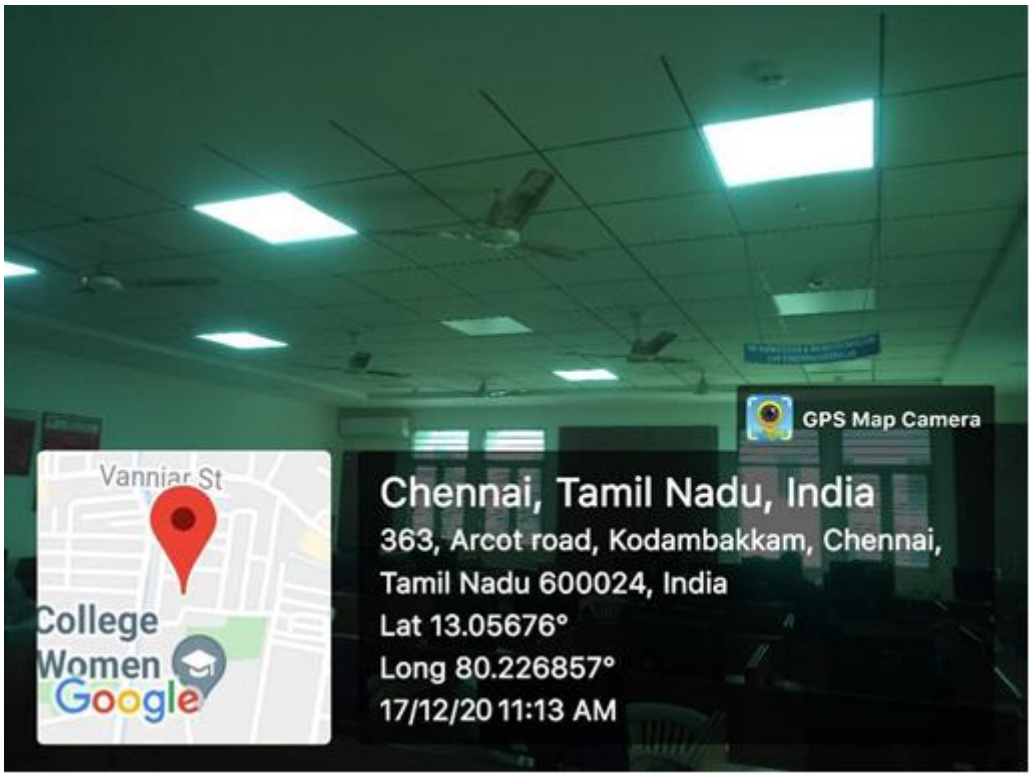

Figure 9. Microprocessor and Microcontroller LAB (ECE)

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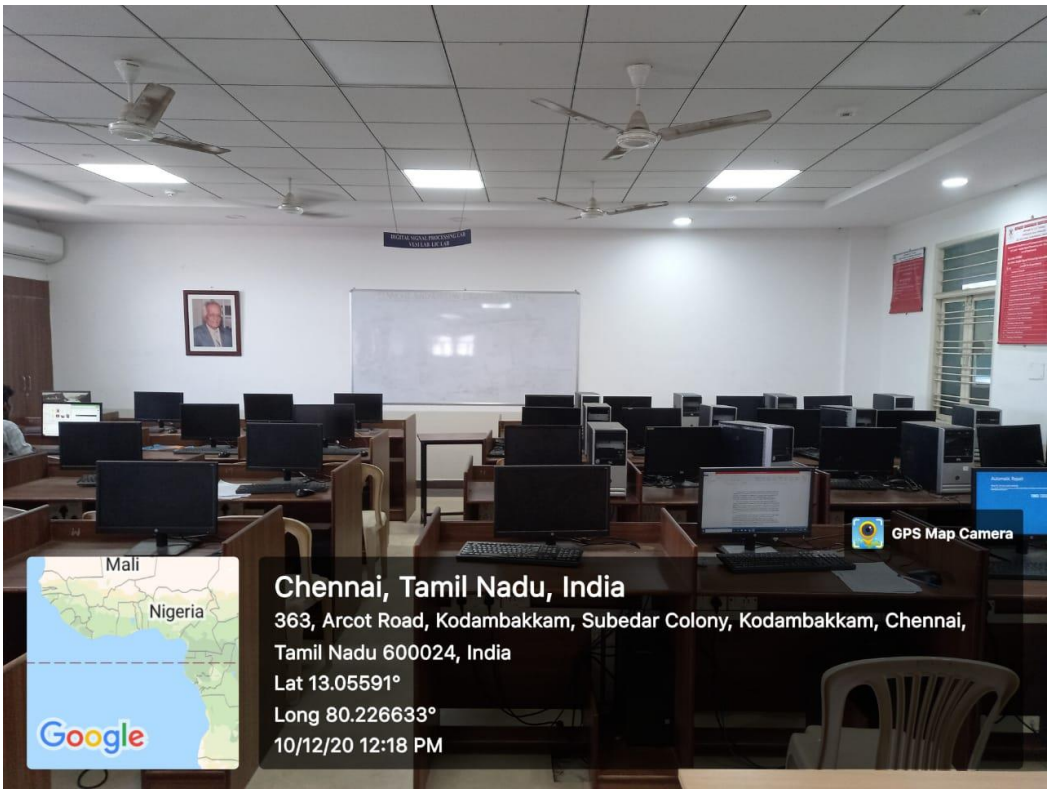

Figure 10. Digital signal processing LAB (ECE)

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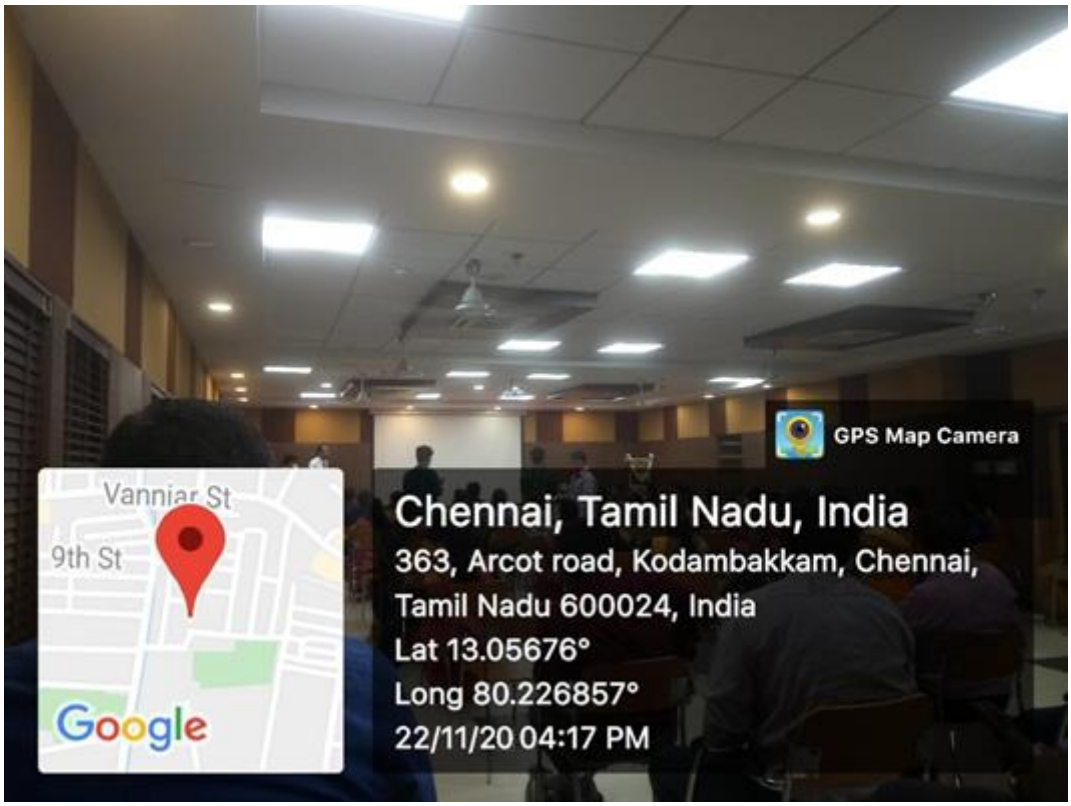

Figure 11. KRS SEMINAR HALL

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Sensor-Based Lighting for Restrooms in Colleges: Enhancing Energy Efficiency and Convenience

MSEC has installed sensor-based lighting systems in restrooms are a significant advancement in the field of energy-efficient and sustainable building management. These systems use various sensors, typically motion sensors, to automatically control lighting within restrooms. By turning lights on in the presence of people and turning them off when there is no presence detected after a set period of time, these systems aim to reduce energy consumption and improve user experience.

Key Features of Sensor-Based Lighting in College Restrooms:

Motion Sensors: Motion sensors are discretely installed within college restroom facilities to detect the presence of people. When motion is detected, the lights are automatically turned on, ensuring that the restroom is well-lit when in use.

Customizable Time Delay Settings: Sensor-based systems often include adjustable time delay settings, allowing colleges to specify how long lights remain on after the last motion is detected. This customization ensures that lighting meets the specific needs of the college environment.

Occupancy Sensors: Advanced systems may incorporate occupancy sensors, which detect both motion and body heat. This ensures that the lights remain on as long as the restroom is actively in use, even if occupants are relatively still.

Daylight Harvesting: For college facilities with access to natural light, sensor-based systems can be integrated with daylight harvesting controls. These controls automatically adjust artificial lighting levels based on available natural light, further reducing energy consumption.

In the college environment, sensor-based lighting systems for restrooms offer a practical solution for enhancing energy efficiency and user convenience. By automatically activating lights when people are present and deactivating them when the restroom is unoccupied, these systems help colleges reduce energy consumption, lower operational costs, and meet sustainability standards. While there are some challenges to address, sensor-based lighting represents a valuable addition to modern college facility design and management.

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SENSOR BASED LIGHTS

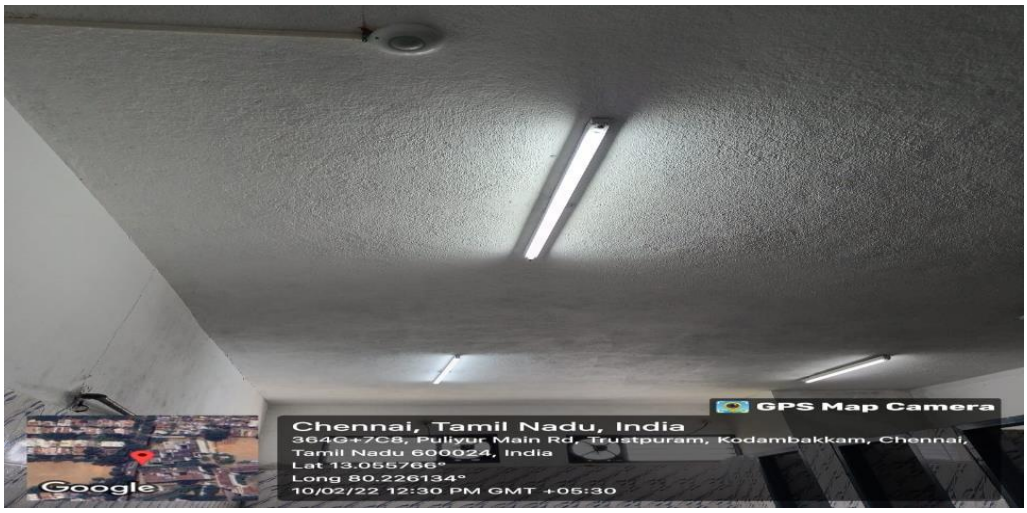

Figure 1. Installed Sensor based Lights in Restrooms(Main block)

Figure 2. Installed Sensor based Lights in Restroom(Main block)

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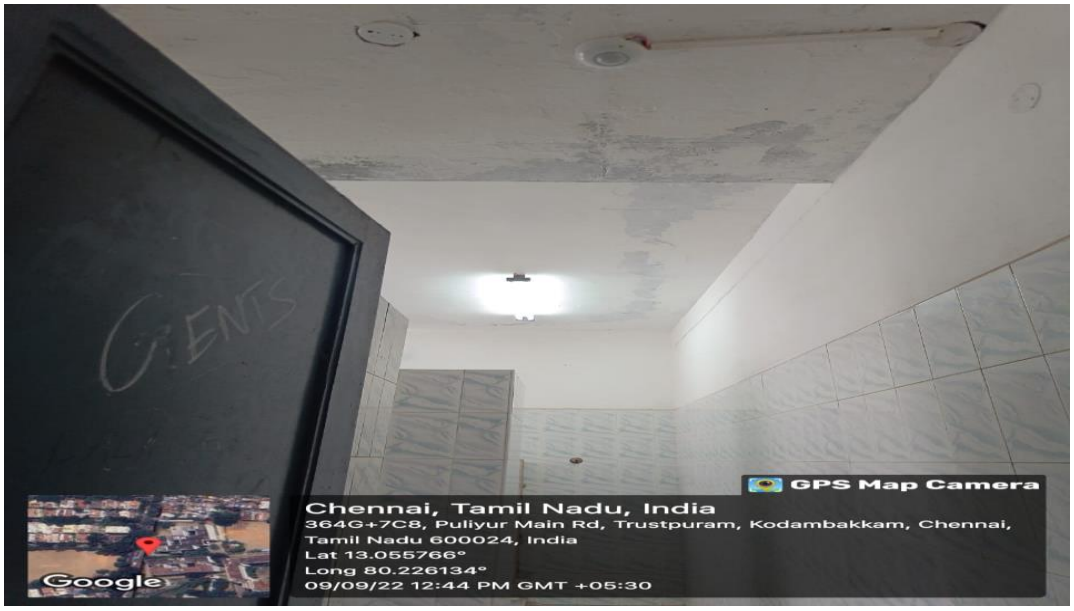

Figure 3. Installed Sensor based Lights in Restrooms(Civil block)

Figure 4. Installed Sensor based Lights in Restrooms(Civil block)

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Figure5. Installed Sensor based Lights in Restrooms(Mech block)

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