

**REPORT OF SUSTAINABILITY / GREEN AUDIT OF
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE,
WARANGAL (2020-21)**



**Internal Quality Assurance Cell
Kakatiya Institute of Technology & Science, Warangal.
2020- 2021**



Principal
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
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Preface

Institutional self-inquiry is a natural and necessary outgrowth of quality of higher education. Concern about environmental degradation and realization of values of environment are logical consequences of scholarly research, teaching and learning process. In its pursuit for improving environmental quality and to maintain a pristine environment for the future generation of students, Kakatiya Institute of Technology & Science, Warangal has made a self-inquiry on environmental quality of the campus with the following objectives: (i) To establish a baseline of existing environmental conditions with focus on natural and physical environment; (ii) To understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, purchase of goods, transportation, etc; (iii) To promote environmental awareness through participatory auditing process; and (iv) To create a report that document baseline data of good practices and provide future strategies and action plans towards improving environmental quality for future.

This report is compiled by a committee constituted by IQAC. As there was no standard model for such an environment/green audit of campuses in the state, the committee brainstormed and evolved a questionnaire. With the help of student volunteers, the major part of the data was compiled, which the committee analyzed. The remaining part which involved measurement of quality was entrusted with the Department of Civil Engineering, Kakatiya Institute of Technology & Science, Warangal.

The committee has made short term and long term suggestions to take environment protection to higher levels and it is hoped that this will receive due attention of the Institute authorities and also all stake-holders of the Institute

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Executive Summary

a. Water management: As such, wise use of water is a general practice in the Institute. Rainwater harvesting is in practice in the Institute.

b. Waste management: Land filling is the general waste management strategy adopted by the Institute a management plan for managing inorganic waste, especially plastics. Biogas plant for effectively managing organic wastes are established in facilities that produce more organic wastes such as canteen, hostels and staff quarters. Further, careless discarding of solid wastes is a common site in many segments of the campus. The campus should be declared free from plastic carry bags and this should be put into practice strictly. However, more departments are now following green charter and started avoiding flex banners and plastic carry bags and cups for social functions and academic programmes.

c. Energy management: A 400kW Grid connected Solar Captive Power Plant at the roof-top of the Block-1, Block-III, Block-IV, Girls Hostel & Boys Hostel Buildings is capable of generating 6.10 lakh units of electricity in a year and it serves as a model for using non-conventional energy sources for future.

d. Landscape/environment: Many departments maintain garden and the campus is greener with fair biodiversity around and gardens maintained by many departments. Absence of long-term eco-restoration programmes for replacing exotic Acacia plantations and land use and development planning remain as a lacuna.

e. Built-up Environment: In general, the built-up environment is not so eco-friendly and there is a need for adopting green habitat concept in future planning of buildings.

f. Transportation: Majority of the students in the campus rely on own Transport and many public transport, indicating lesser carbon foot print of the student community.

g. Green Agenda in Syllabus: Green agenda form part of the curriculum in many departments and eco/nature clubs remain active for the cause of environmental protection, though it is not a common practice in all the departments in the campus.

h. Water Quality: In general, is within the stipulated standards, as there is a 2000 ltr/hour Reverse Osmosis water plant is installed & being used for drinking purpose, and also Two No's of Regen Water Softner Plants are installed at Girls Hostel premises and Boys Hostel premises making usage water more pottable too.

Recommendations

1. Environmental auditing may be conducted by the Kakatiya University, Warangal in every two years under the auspices of the Dept. of Environmental Sciences. The University can also offer consultancy projects on environmental auditing for other academic and research institutions.
2. Rainwater harvesting facilities may be established at more places in both administrative and academic campuses, foreseeing future needs of water. Further, rainwater pits can be prepared at appropriate places identified with the assistance of Department of Geology.
3. Specific waste management plans should be adopted to manage solid waste in the campus, with the assistance of State Suchithwa Mission and use of plastic carry bags, thermocole cups/plates and flex boards should be banned inside the University. For managing organic wastes, biogas plants may be commissioned at the hostels, canteens, biochemistry department and staff quarters. The wastes generated can be used for promoting organic farming activities within the campus and the products can be used in hostels and canteens, with a plan to ensure the availability of organic food in the canteen and hostels for future. There should be a system for the management of hazardous wastes.
4. Green habitat concept should be adopted for all the building construction activities of the University in future, which may help a long way in reducing energy usage, increasing aesthetic appeal of the buildings and class rooms, besides reducing carbon foot print. Further, more green spaces should be established all around the campus around larger trees and shades for the benefit of the students.
5. Vehicle pooling should be promoted both among students and faculty and use of bicycles should be promoted as a policy of the institute.
6. Irrespective of the subjects, environmental education should be part of curriculum and for the post-graduate programmes at least one credit on environmental education or sustainable development as elective should be made compulsory. Alternatively one credit may be given to students participating in environmental conservation/awareness activities
7. E-waste disposal/removing methods to be adopted & administered.

A2. Water Quality Measurement

Well water: Well water samples were collected from different Bore wells & Open well.. The analysed parameters included pH, Colour, Electrical Conductivity, Total Dissolved Solids, Dissolved Oxygen, Acidity, Alkalinity, Sulphate, Chlorine, Nitrate, Phosphate, Iron, Total Hardness, Calcium Hardness and Total Coliforms. All the parameters except pH and Iron were within standard desirable limits of drinking water quality (BIS IS: 10500:1991)..

Part B: Environmental Practices

B1. WATER MANAGEMENT

Sl. No	Department/Block	Wise use of water	Water leakage repair	Use of water purification	Rain Harvest	Use of water Cooler	Water pollution incidence	Water Use per day in liters	Water Storage	Water tank	Water management Practices
1	CIVIL & EIE /BLOCK – I	√	√	√	√	√	X	1000	40,000	√	X
2	LIBRARY/BLOCK- II	√	√	√	√	√	X	600	25,000	√	X
3	MECH, EEE/ BLOCK-III	√	√	√	√	√	X	500	20,000	√	X
4	M&H, MGMT & PSS/BLOCK IV	√	√	√	√	√	X	3,000	60,000	√	X
5	CSE& IT/BLOCK V	√	√	√	√	√	X	1,000	15,000	√	X
6	ECE/ BLOCK VI	√	√	√	√	√	X	2,500	30,000	√	X
7	BANK & GUESTHOUSE	√	x	√	X	√	X	1,000	20,000	√	X
8	STAFF QUARTERS-1	√	√	√	X	√	X	8,000	20,000	√	X
9	STAFF QUARTERS-2	√	√	√	X	√	X	8,000	20,000	√	X
10	GIRLS HOSTEL	√	√	√	X	√	X	25,000	1,00,000	√	X
11	PROJECT OFFICE & XEROX	√	√	√	X	√	X	600	X	X	X
12	PLAY FIELDS	√	√	√	√	√	X	25,000	25,000	√	X
13	LECTURE HALL-1	√	X	X	X	√	X	X	X	X	X
14	LECTURE HALL-2	√	X	X	X	√	X	X	X	X	X
15	LECTURE HALL-3	√	X	X	X	√	X	X	X	X	X
16	LECTURE HALL-4	√	X	X	X	√	X	X	X	X	X
17	NEW WORK SHOP	√	√	√	√	√	X	300	X	√	X
18	RO WATER PLANT	√	√	√	X	√	X	15,000	40,000	√	X
19	INDOOR STADIUM	√	√	√	X	√	X	15,000	20,000	√	X
20	SHED BLOCKS – 4 No's	√	√	√	X	√	X	2,000	5,000	√	X
21	BOYS HOSTEL-1	√	√	√	√	√	X	20,000	50,000	√	X
22	BOYS HOSTEL-2	√	X	√	√	√	X	5,000	40,000	√	X
23	DISPENSARY	√	√	√	X	√	X	100	X	X	X
24	STORE	√	X	X	X	√	X	X	X	X	X
25	HOSTEL SHED- 5 NO's	√	√	√	X	√	X	6,000	15,000	√	X
26	OLD KITS DINNING HALL	√	√	√	X	√	X	3,000	4,000	X	X
27	SEWAGE TREATMENT PLANT	√	√	√	√	X	X	X	X	X	X
28	AUDITORIUM	√	√	√	X	√	X	500	X	X	X
29	PHYSICALLY CHALLENGED TOILETS	√	√	√	√	X	X	500	X	√	X

B2 WASTE MANAGEMENT

	a	b	c	d	e	f	g	h	
Sl. No	Department/Block	Food/Organic waste /day	Non Plastic dry waste/day	Plastic, Thermocol /day	Other(e-waste)	Management of Organic Waste	Management of Other Waste?	Waste dumping it?	Waste Management Practices
1	CIVIL & EIE /BLOCK – I	L	L	L	X	√	√	√	√
2	LIBRARY/BLOCK- II	L	L	L	X	√	√	√	√
3	MECH, EEE/ BLOCK-III	L	L	L	X	√	√	√	√
4	M&H, MGMT & PSS/BLOCK IV	L	M	L	X	√	√	√	√
5	CSE& IT/BLOCK V	L	L	L	L	√	√	√	√
6	ECE/ BLOCK VI	L	L	L	X	√	√	√	√
7	BANK & GUESTHOUSE	L	L	L	X	√	√	√	√
8	STAFF QARTERS-1	M	M	L	X	√	√	√	√
9	STAFF QARTERS-2	M	M	L	X	√	√	√	√
10	GIRLS HOSTEL	H	H	L	X	√	√	√	√
11	PROJECT OFFICE & XEROX	L	L	L	X	√	√	√	√
12	PLAY FIELDS	L	L	L	X	√	√	√	√
13	LECTURE HALL-1	L	L	L	X	√	√	√	√
14	LECTURE HALL-2	L	L	L	X	√	√	√	√
15	LECTURE HALL-3	L	L	L	X	√	√	√	√
16	LECTURE HALL-4	L	L	L	X	√	√	√	√
17	NEW WORK SHOP	L	L	L	X	√	√	√	√
18	RO WATER PLANT	X	X	X	X	X	√	X	√
19	INDOOR STADIUM	L	L	L	X	√	√	√	√
20	SHED BLOCKS – 4 No's	L	L	L	X	√	√	√	√
21	BOYS HOSTEL-1	H	H	L	X	√	√	√	√
22	BOYS HOSTEL-2	H	H	L	X	√	√	√	√
23	DISPENSARY	M	M	L	X	√	√	√	√
24	STORE	L	L	L	X	√	√	√	√
25	HOSTEL SHED- 5 NO's	L	L	L	X	√	√	√	√
26	OLD KITS DINNING HALL	L	L	L	X	√	√	√	√
27	SEWAGE TREATMENT PLANT	MIN	MIN	MIN	X	√	√	√	√
28	AUDITORIUM	L	L	L	X	√	√	√	√
29	PHYSICALLY CHALLENGED TOILETS	L	L	L	X	√	√	X	√

B3 ENERGY MANAGEMENT

Sl No	Department/Block	No. of Tubes+ Bulbs	No. of A/C	No. of LCD Projector	No. of Photocopier	Computers +Printer	LEDs	Non-conventional (solar)	Star rating	Energy Management Practices
1	CIVIL & EIE /BLOCK – I	300	10	6	1	120	20	60	√	√
2	LIBRARY/BLOCK- II	200	27	1	2	265	2	X	√	√
3	MECH, EEE/ BLOCK-III	350	6	4	X	120		60	√	√
4	M&H, MGMT & PSS/BLOCK IV	385	34	20	6	360	35	100	√	√
5	CSE& IT/BLOCK V	450	41	12	X	405	X	X	√	√
6	ECE/ BLOCK VI	100	10	3	X	160	X	X	√	√
7	BANK & GUESTHOUSE	65	12	X	X	20	X	X	√	√
8	STAFF QURTERS-1	36	2	X	X	X	X	X	√	√
9	STAFF QURTERS-2	36	2	X	X	X	X	X	√	√
10	GIRLS HOSTEL	510	X	X	X	X	X	80	X	√
11	PROJECT OFFICE & XEROX	15	X	X	2	2	X	X	X	√
12	PLAY FIELDS	X	X	X	X	X	X	X	X	X
13	LECTURE HALL-1	15	X	X	X	X	X	X	X	√
14	LECTURE HALL-2	10	X	X	X	X	X	X	X	√
15	LECTURE HALL-3	15	X	X	X	X	X	X	X	√
16	LECTURE HALL-4	12	X	X	X	X	X	X	X	√
17	NEW WORK SHOP	25	X	X	X	X	X	X	X	√
18	RO WATER PLANT	6	X	X	X	X	X	X	X	√
19	INDOOR STADIUM	250	X	X	X	2	10	X	X	√
20	SHED BLOCKS – 4 No's	12	X	X	X	X	X	X	X	√
21	BOYS HOSTEL-1	450	X	X	X	X	10	50	X	√
22	BOYS HOSTEL-2	100	X	X	X	X	20	50	X	√
23	DISPENSARY	6	X	X	X	X	X	X	X	√
24	STORE	10	X	X	X	X	X	X	X	√
25	HOSTEL SHED- 5 NO's	18	X	X	X	X	X	X	X	X
26	OLD KITS DINNING HALL	18	X	X	X	X	X	X	X	X
27	SEWAGE TREATMENT PLANT	6	X	X	X	X	X	X	X	√
28	AUDITORIUM	10	2	2	X	X	20	X	√	√
29	PHYSICALLY CHALLENGED TOILETS	5	X	X	X	X	X	X	X	X

B4 LANDSCAPE/ENVIRONMENT

Sl. No	Department/Block	Overall Green cover	Garden	Indigenous Trees/Plants	Exotic Plants /Animals	Overall Biodiversity	Landscape Management Plan	Natural water bodies
1	CIVIL & EIE /BLOCK – I	G	√	√	√	X	√	√
2	LIBRARY/BLOCK- II	G	√	√	√	X	√	X
3	MECH, EEE/ BLOCK-III	G	√	√	√	X	√	X
4	M&H, MGMT & PSS/BLOCK IV	G	√	√	√	X	√	X
5	CSE& IT/BLOCK V	G	√	√	X	X	X	X
6	ECE/ BLOCK VI	G	√	√	X	X	√	X
7	BANK & GUESTHOUSE	G	X	√	X	X	X	X
8	STAFF QURTERS-1	G	√	√	X	X	X	X
9	STAFF QURTERS-2	G	√	√	X	X	X	X
10	GIRLS HOSTEL	G	√	√	X	X	X	X
11	PROJECT OFFICE & XEROX	G	X	√	X	X	X	X
12	PLAY FIELDS	G	√	√	X	X	√	X
13	LECTURE HALL-1	A	X	√	X	X	X	X
14	LECTURE HALL-2	A	X	√	X	X	X	X
15	LECTURE HALL-3	A	X	√	X	X	X	X
16	LECTURE HALL-4	A	X	√	X	X	X	X
17	NEW WORK SHOP	A	√	√	X	X	X	X
18	RO WATER PLANT	A	X	√	X	X	X	X
19	INDOOR STADIUM	G	√	√	√	X	√	X
20	SHED BLOCKS – 4 No's	G	X	√	X	X	X	X
21	BOYS HOSTEL-1	G	√	√	√	X	X	X
22	BOYS HOSTEL-2	G	√	√	√	X	X	X
23	DISPENSARY	G	√	√	X	X	X	X
24	STORE	A	X	√	X	X	X	X
25	HOSTEL SHED- 5 NO's	A	X	√	X	X	X	X
26	OLD KITS DINNING HALL	A	X	√	X	X	X	X
27	SEWAGE TREATMENT PLANT	G	√	√	X	√	√	√
28	AUDITORIUM	G	√	√	X	X	X	X
29	PHYSICALLY CHALLENGED TOILETS	G	X	√	X	X	X	X

B5 BUILT-UP ENVIRONMENT

		*a	b	c	d	e	*f	g	*h	*i	j
Sl. No	Department/Block	Building type	Area in Sq. ft	Eco-friendliness	Fire prevention provisions	Aesthetic appeal	Serenity of class rooms	Ladies rest room	Recreation room	Provision for differently abled	Toilets; Men, women, diff abled
1	CIVIL & EIE /BLOCK – I	R/A	41,972	G	√	G	G	√	X	√	12
2	LIBRARY/BLOCK- II	R	27,420	G	√	G	G	√	X	√	7
3	MECH, EEE/ BLOCK-III	R	45,934	G	√	G	G	√	X	√	8
4	M&H, MGMT & PSS/BLOCK IV	R	1,16,693	G	√	G	G	√	X	√	50
5	CSE& IT/BLOCK V	R	27,955	G	√	G	G	√	X	√	13
6	ECE/ BLOCK VI	R	38,517	G	√	G	G	√	X	√	36
7	BANK & GUESTHOUSE	R	8,028	G	√	G	X	√	√	X	12
8	STAFF QURTERS-1	A	5,850	G	√	G	X	X	X	X	12
9	STAFF QURTERS-2	A	5,850	G	√	G	X	X	X	X	12
10	GIRLS HOSTEL	R	71,070	G	√	G	X	√	√	X	88
11	PROJECT OFFICE & XEROX	A	500	G	√	G	X	X	X	X	1
12	PLAY FIELDS	X	X	G	X	G	X	X	X	X	X
13	LECTURE HALL-1	A	712	A	X	G	A	X	X	X	X
14	LECTURE HALL-2	A	712	A	X	A	A	X	X	X	X
15	LECTURE HALL-3	A	712	A	X	A	A	X	X	X	X
16	LECTURE HALL-4	A	712	A	X	A	A	X	X	X	X
17	NEW WORK SHOP	I	8,915	A	√	G	G	X	X	√	X
18	RO WATER PLANT	A	1,795	G	√	G	X	X	X	X	X
19	INDOOR STADIUM	R/I	15,446	G	√	G	G	√	√	√	8
20	SHED BLOCKS – 4 No's	A/I	12,747	G	√	A	A	√	√	√	10
21	BOYS HOSTEL-1	R	55,100	G	√	G	X	X	√	X	100
22	BOYS HOSTEL-2	R	26,028	G	√	G	X	X	√	X	50
23	DISPENSARY	A	433	A	√	A	X	X	X	√	1
24	STORE	I	1,630	A	√	A	X	X	X	X	1
25	HOSTEL SHED- 5 NO's	A	18,011	A	X	A	X	X	X	X	30
26	OLD KITS DINNING HALL	A	3687	A	X	A	X	X	X	X	2
27	SEWAGE TREATMENT PLANT	R	-	G	X	G	X	X	X	X	-
28	AUDITORIUM	I	3,707	A	√	G	G	√	√	√	6
29	PHYSICALLY CHALLENGED TOILETS	R	228	G	X	G	A	√	X	√	2

B6 TRANSPORTATION

		a	b	c	d	e
Sl. No	Department/Block	Dept. Vehicle No	Members with vehicles	Members using public transportation (%)	Use of Bicycles?	Vehicle pooling?
1	CIVIL & EIE /BLOCK – I	X	36	80	1	X
2	LIBRARY/BLOCK- II	X	8	10	1	√
3	MECH, EEE/ BLOCK-III	X	90	70	2	X
4	M&H, MGMT & PSS/BLOCK IV	2	28	60	3	√
5	CSE& IT/BLOCK V	X	54	80	1	X
6	ECE/ BLOCK VI	X	35	70	1	√
7	BANK & GUESTHOUSE	X	X	10	1	√
8	STAFF QURTERS-1	X	6	5	1	X
9	STAFF QURTERS-2	X	6	5	X	X
10	GIRLS HOSTEL	X	5	90	X	X
11	PROJECT OFFICE & XEROX	2	8	70	5	X
12	PLAY FIELDS	X	X	50	1	X
13	LECTURE HALL-1	X	X	X	X	X
14	LECTURE HALL-2	X	X	X	X	X
15	LECTURE HALL-3	X	X	X	X	X
16	LECTURE HALL-4	X	X	X	X	X
17	NEW WORK SHOP	X	4	X	X	X
18	RO WATER PLANT	X	2	80	1	X
19	INDOOR STADIUM	X	6	60	1	X
20	SHED BLOCKS – 4 No's	X	-	X	X	X
21	BOYS HOSTEL-1	X	8	90	X	X
22	BOYS HOSTEL-2	X	X	90	X	X
23	DISPENSARY	1	X	X	X	X
24	STORE	X	1	X	X	X
25	HOSTEL SHED- 5 NO's	X	1	X	X	X
26	OLD KITS DINNING HALL	X	X	80	X	X
27	SEWAGE TREATMENT PLANT	X	X	X	X	X
28	AUDITORIUM	X	X	X	X	X
29	PHYSICALLY CHALLENGED TOILETS	X	X	X	X	X

B7 GREEN AGENDA IN SYLLABUS

		*a	*c	*d	e	*i	*j
Sl. No	Department/Block	Environmental education in syllabus	Green Research	Green Clubs	Animal Experiments?	Ethics committee?	Extension related to Environment
1	CIVIL & EIE /BLOCK – I	√	√	√	X	X	X
2	LIBRARY/BLOCK- II	X	X	X	X	X	X
3	MECH, EEE/ BLOCK-III	√	√	√	X	X	X
4	M&H, MGMT & PSS/BLOCK IV	√	X	√	X	X	X
5	CSE& IT/BLOCK V	√	√	√	X	X	X
6	ECE/ BLOCK VI	√	√	√	X	X	X
7	BANK & GUESTHOUSE	X	X	X	X	X	X
8	STAFF QARTERS-1	X	X	√	X	X	X
9	STAFF QARTERS-2	X	X	X	X	X	X
10	GIRLS HOSTEL	X	X	X	X	X	X
11	PROJECT OFFICE & XEROX	X	X	√	X	X	X
12	PLAY FIELDS	X	X	X	X	X	X
13	LECTURE HALL-1	X	X	X	X	X	X
14	LECTURE HALL-2	X	X	X	X	X	X
15	LECTURE HALL-3	X	X	X	X	X	X
16	LECTURE HALL-4	X	X	X	X	X	X
17	NEW WORK SHOP	X	X	X	X	X	X
18	RO WATER PLANT	X	X	X	X	X	X
19	INDOOR STADIUM	X	X	X	X	X	X
20	SHED BLOCKS – 4 No's	X	X	X	X	X	X
21	BOYS HOSTEL-1	X	X	X	X	X	X
22	BOYS HOSTEL-2	X	X	X	X	X	X
23	DISPENSARY	X	X	X	X	X	X
24	STORE	X	X	X	X	X	X
25	HOSTEL SHED- 5 NO's	X	X	X	X	X	X
26	OLD KITS DINNING HALL	X	X	X	X	X	X
27	SEWAGE TREATMENT PLANT	X	X	X	X	X	X
28	AUDITORIUM	X	X	X	X	X	X
29	PHYSICALLY CHALLENGED TOILETS	X	X	X	X	X	X

WASTE BINS ARE KEPT IN THE BUILDINGS AND ALONG THE ROADS, PATHWAYS FOR WASTE COLLECTION



COLLECTED WASTE FROM THE WASTE BINS IS DUMPED INTO THE LARGE BINS NEAR BUILDINGS



INDOOR STADIUM AREA GARDEN AND SURROUNDINGS



GARDEN INFRONT OF BLOCK-II AND BLOCK-IV BUILDINGS WITH GREEN SURROUNDINGS



FLORA IN THE CAMPUS IS IN ABUNDANCE AND FOUND EVERYWHERE





GREEN KITS



400 Kw CAPTIVE GRID CONNECTED SOLAR POWER PLANTS ARE OVER BLOCK-I, III, IV,
BOYS & GIRLS HOSTELS



350 - kLD SEWAGE TREATMENT PLANT WITH MBBR TECHNOLOGY & OZONATION



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