

॥ सत्यमेव जयते ॥

KUNARIYA
JUTH GRAM PANCHAYAT
DEVELOPMENT WITH GOOD GOVERNANCE

॥ सा पिधा या पिमुक्तेय ॥



TO WHOM SO EVER IT MAY CONCERN

This certifies that the Department of Social Works at K.S.K.V. Kachchh University in Bhuj has conducted Environmental Promotional Activities in Kunariya Village, Taluka Bhuj, Kachchh. These activities primarily involved cleaning water bodies in the village area, tidying up the Anganwadi, and planting trees to create a cleaner and healthier environment, thereby supporting the well-being of the village community.

શ્રીમતી સુરેશ જાંગી

SARPANCH
SHREE KUNARIYA JUTH GRAAM PANCHAYAT



સંપર્ક : સરપંચ : ૯૯૧૩૦ ૫૫૩૦૫ | તલાટી : ૯૯૭૮૫ ૩૧૬૩ | E-mail: kunariyapanchayat@gmail.com

Tree PLantation at Village Street of Kunariya Village in the presence of Forest Officers and Dist. Administration



Cleaning of Water Bodies at Kunariya Village in the presence Forest Officers and Dist. Administration



Post Cleaning of Water Bodies at Kunariya Village



Cleaning of Aganwadi at Kunariya Village



Cleaning of School Campus at Kunariya Village



Cleaning of Pingleshwar Beach







Cleanliness oath for keeping campus clean



Cleanliness at campus



Promotional event for medicinal plant in the presence of Dean Ayurveda university, education minister shree Kirtisinhji



Tree streaming at campus to protect and grow



Tree plantation




KRANTIGURU SHYAMJI KRISHNA VERMA
KACHCHH UNIVERSITY

University Campus,
MUNDRA ROAD, BHUJ-KUCHCHH

PHONE NO. 237300

PHONE NO. 235002

Date: 22/05/2024

Ref. No: K.U./Estate/ 1132

To,
Shri. Navin Ojha,
104,ZBLuxuria,
49 Nutan Bharat Society,
Alkapuri,
Vadodara.

Subject:-Work Order for carrying out Green Env. Audit in the campus

Sir,

This is with reference to the quotation invited for the Env. And Green audit to be carried out in the campus. We are Pleased to inform you that, University has gone through the received quotations and decided to continue with your proposal looking at your working experience. The work and Tor will be as under;

- The work will include like biodiversity, water, energy, waste management, carbon foot print as well as your expert suggestions for the campus. The report need to have certification from your side,
- The proposed work should be completed within 3 months from the agreement and your acknowledgement looking to the urgency and time.
- As per your quotation, the work charges will be Rs.40,000/- and it would be advisable to carry out at least one visit (Not more than two) by you and /or your team.
- Travel Expense from Vadodara, Report printing charges and taxes is payable as per actual.
- Soft copy of the report will be required along with work and desirable to be presented to University Authority prior printing.

We wish to look forward for your acceptance of the work order as earlier as possible.

Best wishes,


REGISTRAR
K.S.K.V Kachchh University
Bhuj-Kachchh



**ENVIRONMENT, GREEN,
WATER AND ENERGY
AUDIT REPORT**
for
***KRANTIGURU SHYAMJI
KRISHNA VERMA KACHCHH
UNIVERSITY***
BHUJ, KACHCHH



**KRANTIGURU SHYAMJI
KRISHNA VERMA KACHCHH
UNIVERSITY
BHUJ, KACHCHH
GUJARAT-370001**

Established—2003

***ENVIRONMENT, GREEN, WATER AND
ENERGY AUDIT REPORT
WITH
ACTION PLAN
2019 - 2024***



Prepared by

**Universal Consultancy, Vadodara
GUJ\VDD\17959 dated 17-10-2007
IGBC-AP, GRIHA-PATRON, IGBC-FELLOW
MIE, Member-INTACH, Member-IGBC,
Chartered Engineer (India)**



GRIHA--PATRON



IGBC--FELLOW



ASHRAE—MEMBER



INTACH—MEMBER



GEM--CP

COPYRIGHT

This Green & Environment Audit Report 2019-2024 with Action Plan for ***Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, Kachchh, Gujarat*** is a copyright of N. K. Ojha of Universal Consultancy. He has a right over the original as well as the derivative work done on this report. It prevents one and all from producing, using, selling or distributing any of its invention and research work. No part of it shall be copied, reproduced or separated from the body of its contents. If extra copies are required, the concerned may be requested to do the needful and copies officially obtained from them alone. Violating above said shall be liable for prosecution under Copyright Regulation, 2017.

N. K. Ojha
Universal Consultancy
Vadodara
9825821684
navinojha13@gmail.com
20th of May, 2024

PREFACE

The National Assessment and Accreditation Council, (NAAC) assessment is mandatory for all the recognized Higher Educational Institutions of this country. Criterion VII in the name of Institutional Values & Best Practices is a part of NAAC Manual and all Higher Education Institutions are supposed to comply to this Criterion too at the time of applying for the assessment.

This criterion carries 100 credits and various measures adopted by the Institution regarding Environment Friendly approach such as Water Efficiency, Rain Water Harvesting, Ground Water Recharge, Reduce-Reuse-Recharge strategies for Water, Energy Efficiency, Energy Performance Index of the building, Hybrid Energy, Indoor Environmental Quality, Eco-friendly building material, Low ODP & VOC material, Post Occupancy Waste Management, Energy Audit, Water Audit, Green Policy of the campus, Green measures beyond the fence are considered. Barrier free environment is also the part of this criterion.

Higher Education Institutions are required to submit compliance to above said measures adopted in Environment friendly approach adopted on their campus. This can be concluded in Green & Environment along with the Water & Energy Audit. The Institution has also to spell out the Green Policy for their campus development and operation.

Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

Hon'ble Prime Minister Narendra Modi on 02-11-2021 gave a five-pronged target for India and finally committed to a Net Zero emission target by 2070, joining the likes of the US, the UK and China.

This will be possible only and only if we inculcate Environment friendly approach and importance of Water, Energy, Air, Space and Earth to coming generation.

Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, Kachchh is applying for NAAC accreditation and hence the University Management has decided to conduct an external Green Evaluation by a competent Green Auditor along with a Green Audit Assessment Team headed by **Dr. R. V. Bariya**, and assisted by **N. K. Ojha, of Universal Consultancy, Vadodara.**

Green Audit or Environment Audit has also focussed on the Carbon Footprint reduction measures being implemented by the University Management. The auditing was done for the period extending from **01-04-2019**

The concept, structure, objectives, methodology, tools of analysis, time frame and cross-cutting themes of the audit are discussed in this report.

N. K. Ojha
20-05-2024

ACKNOWLEDGMENT

Universal Consultancy Team thanks Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, Kachchh assigning this important work of Green & Environment Audit.

We appreciate the cooperation extended to our team during the entire process. Our special thanks are due to **Shri. Arpan R Thakkar & Team IQAC** with his colleagues for giving us necessary inputs to carry out this very vital exercise of Green & Environment Audit. We are also thankful to the members of Green & Environment Audit Committee, who were actively involved while collecting the data and conducting field measurements

Efforts have been made to prepare the Report useful for the University Teachers, Staff & the Students, as well as all Professionals to study and learn the Concept, Management & the Technical Feasibility of implementing the Report in the University. This is the unique activity jointly performed by a Team.

I congratulate **Dr. Mohanlal Patel, Vice Chancellor**, and his entire team of the University, staff and other professionals for initiating and undertaking this very vital exercise of Green & Environment Audit.

A word of thanks to **Dr. Anil Gor**, for co-ordinating the entire exercise of Green & Environment Audit and making available required documents promptly without which this Audit was difficult.

N. K. Ojha

20-05-2024

TABLE OF CONTENTS

Chapter 1 – Context.....	8-11
1.1	NAAC Requirements for Institutional Values & Best Practices
1.2	NAAC Criterion VII
Chapter 2–Profile & Features of University.....	12-18
2.1	Brief History
2.2	Milestones
2.3	Administration & Management
2.4	Students, Faculty & Staff Strength—2021-2022
2.5	Physical Structure & Features
Chapter 3 – Concept.....	19
Chapter 4 – Objectives of Green Auditing.....	20-22
4.1	Green Audit Assessment Team
Chapter 5 – Methodology Adopted.....	23-24
5.1	Onsite Visit
5.2	Focus Group Discussion & Seminars
Chapter 6- Carbon Footprint Reduction.....	25-34
6.1	Office / Building Survey
6.2	Carbon Footprint
6.3	Carbon Audit Tools & Analysis
6.4	Flora & Carbon Footprint Reduction
6.5	Carbon Absorption by Flora
6.6	Oxygen Emission by Flora
6.7	Carbon Footprint Reduction Table
Chapter 7 – Energy Efficiency	35-43
7.1	Implementation of ECBC / ASHRAE / LPD / EPD Norms
7.2	Total Energy Consumption & Equivalent CO ₂ Emission
7.3	Solar Panels On-Grid
7.4	Energy Efficiency & Conservation
7.5	Outdoor Light Pollution Reduction
7.6	Energy Performance Index

Chapter 8 – Eco-Friendly Commuting Practices.....44-48

- 8.1 Vehicles on the Campus & it's Carbon Emission
- 8.2 Parking Facility & Regulations

Chapter 9 – Sustainable Development.....49-57

- 9.1 Green Policy
- 9.2 Best Practices & Initiatives
- 9.3 Heat Island Reduction --- Roof & Non-Roof
- 9.4 Building Operation & Maintenance
- 9.5 Design for Differently Abled
- 9.6 Sustainable Development---Awards & Appreciation

Chapter 10 – Water Efficiency.....58-66

- 10.1 Present Scenario
- 10.2 Water Efficient Fixtures
- 10.3 Rain Water Harvesting & Ground Water Recharge
- 10.4 Landscape Design & Management of Irrigation System
- 10.5 Water Metering
- 10.6 Water Audit---- Objectives & Benefits

Chapter 11 – Post Occupancy Waste Management System.....67-70

Chapter 12 – Indoor Environmental Quality, Health & Comfort.....71-84

- 12.1 Tobacco Smoke Control
- 12.2 Fresh Air Ventilation & Daylighting
- 12.3 Well-Being Facilities/Health & Comfort
- 12.4 Community Friendly Campus
- 12.5 Material Resources & Green Material

Chapter 13 – Environmental Consciousness & Institutional Distinctiveness85-86

Chapter 14 – Suggestions & Recommendations.....87-93

GREEN & ENVIRONMENT AUDIT REPORT

WITH ACTION PLAN (2019 – 2024)

FOR

***KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH
UNIVERSITY, BHUJ, KACHCHH***

1. Context

1.1 NAAC requirements for Institutional Values & Best Practices

Criterion VII under Manual for Self-Study Report refers to:
University Values and Best Practices

An Educational University operates in the context of the larger education system in the country. In order to be relevant in changing national and global contexts an Educational University has to be responsive to the emerging challenges and pressing issues. It has a social responsibility to be proactive in the efforts towards development in the larger contexts. This role of the University is reflected in terms of the kinds of programmes, activities and preferences (values) that it incorporates within its regular functioning. The extent to which an University is impactful in this is a sure reflection of its quality.

Every University has a mandate to be responsive to at least a few pressing issues such as gender equity, environmental consciousness and sustainability, inclusiveness and professional ethics, but the way it addresses these and evolves practices will always be unique.

Every University faces and resolves various kinds of internal pressures and situations while doing this. Some meaningful practices pertinent to such situations are evolved within the

university and this helps smooth functioning and also lead to enhanced impact.

Such practices which are evolved internally by the university leading to improvements in any one aspect of its functioning – academic, administrative or organizational, - are recognized as a “**Best Practices**”. Over a period of time, due to such unique ways of functioning each university develops distinct characteristic which becomes its recognizable attribute. A few of **Best Practices** proposed are as below.

- ***Fostering Social responsibility in young minds through community engagement***
- ***Adaptive success strategies for holistic and multidisciplinary education.***
- ***Promoting Academic Excellence Through Enriched Knowledge***
- ***Making students as leaders in all walks of life***
- ***Strategic Footprints of Growth and Development***
- ***Moulding Men and Women for Service to the Nation***
- ***Promoting Health & Wellness through Physical Education***

The focus of Criterion VII is captured in the following Key Indicators:

1. University Values and Social Responsibilities

2. Best Practices

3. Institutional Distinctiveness

- 1. University Values and Social Responsibilities*** The university organizes gender equity promotion programmes. The university displays sensitivity to issues like climate change and environmental issues. It adopts environment friendly practices and takes necessary actions such as – Energy Conservation, Rain Water Harvesting, Waste Recycling

(solid/liquid waste management, e-waste management), Carbon Neutral, Green Practices etc.

The Institution facilitates the differently abled (Divyangjan friendliness), effective dealing of location advantages and disadvantages (situatedness), explicit concern for human values and professional ethics etc. In other words, the concerns for social responsibilities as well as the values held by the university are explicit in its regular activities.

- 2. *Best Practices*** Any practice or practices that the University has internally evolved and used during the last few years leading to positive impact on the regular functioning of the university can be identified as “Best Practice/s”. These are not any activity prescribed by some authority. At some point in time the university evolves some innovation or a change in some aspect of functioning. This practice is relevant mainly within the university at a given point in time. It could be in respect of teaching learning, office practices, maintenance and up keep of things or dealing with human beings or money matters. But adopting that practice has resolved the difficulty or has brought in greater ease in working in that aspect.

In brief, these “Best Practices” are relevant within the Institutional context and may pertain to either academic or administrative or organizational aspects of institutional functioning.

The Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, Kachchh has taken care and worked in depth towards “Best Practices”, which will be dealt in detail in later part of this Report.

- 3. *University Distinctiveness*** Every University would like to be recognized for certain of its attributes which make it “Distinct”, or, one of its kinds. Such attributes characterize the University and are reflected in all its activities in focus and practice. The Krantiguru Shyamji Krishna Verma Kachchh

University, Bhuj, Kachchh has excelled in this area too, which will be dealt in detail in later part of this Report.

1.2 NAAC Criterion VII

This Green & Environment Audit Report for the University incorporates all the key indicators of Criterion VII and has also voluntarily incorporated many Green Building norms and a few innovative approaches for Green and Sustainable development of the University infrastructure.

The Green & Environment Audit Report is based on IGBC / GRIHA / ECBC / NBC /ASHRAE norms. All baseline case is considered as per above given provisions as stated by National and International standards.

Then design case is worked out to conserve water and energy. Also, indoor environmental quality and post occupancy waste management system is studied and guided to convert existing campus into zero discharge campus.

*The Innovative approach such as Zero Discharge Campus, Net Zero Building, Zero Emission Campus and Water Positive Campus is studied and discussed in detail with University Authorities to explore possibilities in these fields too and make the University as **Case Study** for all the Students, Staff, Visitors and Students/Staff of adjoining Colleges/Universities.*

The University to Act and Project itself as Motivator in Sustainable Development field.

2. Profile of Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj, Kachchh

2.1 Brief History:

Education is the basic requirement for the development of any region. The Govt. of Gujarat has taken a commendable decision to provide a separate University for the region of Kachchh to fulfil the demand of the people of Kachchh. The Krantiguru Shyamji Krishna Verma Kachchh University Act was published in the Govt. Gazette in March 2003.

All the ten colleges of Kachchh district previously affiliated to the Gujarat University, with the Notification No: GH/SH/5/KUG-2104-1648-Kh of Gujarat State affiliated to Kachchh University on 22-June-2004.

The eminent leader Shyamji Krishna Verma of Mandvi, Kachchh motivated the independence movement from outside India, whose name is being given to this University and now the University is known as "The Krantiguru Shyamji Krishna Verma Kachchh University".

The University recognized under UGC 2(f) by the notification No : F:9-11/2003/ CPP-1 Dated : 3-2-2004.

The foundation stone was laid by Hon'ble Chief Minister Gujarat State for starting the construction work of Kachchh University Campus on Dt. 24/9/2004. The Construction work for the administrative blocks, four faculty blocks, Library, Computer Building, Guest House, Boys & Girls Hostel, with the budget estimates 35 crores funded by Gujarat State is going on the campus. The Krantiguru Shyamji Krishna Verma Kachchh University has started its administrative and academic activity at new developing campus from academic the year 2007-08.

University started with 10 colleges in 2004 having 28 colleges with more than 15000 students and nearly 200 teachers working in the faculties of Arts, Commerce, Science, Education,

Law, Technology including Engineering and Pharmacy. The University is providing higher education as par with any other university of the state and India.

The University is organizing the youth culture and sports activities to encourage the students and providing them a platform, more than 500 students participated in the Inter University Culture and sports activities organized by AIU (Association of Indian Universities, New Delhi). In the year 2005-06 the student of the affiliated college secured second position in the "Collage Painting" of the youth festival in the west zone inter university tournament.

Similarly, a student of affiliated college secured third position in "Mimicry" event in the youth festival in the west zone inter university tournament in the year 2007-08.

"Let us think of education as the means of developing our greatest abilities, because in each of us there is a private hope and dream which, fulfilled, can be translated into benefit for everyone and greater strength for our nation."

"Our progress as a nation can be no swifter than our progress in education. The human mind is our fundamental resource."

2.2 Milestones:

- To offer cutting-edge courses that explore local resources and opportunities and encourage students for innovation and entrepreneurship.
- To serve as a catalyst for positive change by addressing complex challenges faced by society through collaborative and interdisciplinary research.
- To inspire and empower students through transformative education, innovative research, and impactful community engagement, preparing them to become global citizens and leaders of tomorrow.

- To promote a dynamic learning environment that nurtures critical thinking, creativity, intellectual curiosity, academic excellence, and cultural understanding among the students and faculty
- To assimilate and transmit Indian values for character-building through moral and humanitarian education.

2.3 Administration & Management:

The entire administration is managed by the Vice Chancellor of the University, who is assisted by the Registrar, Executive Council & Board of Management, Senate and several committees to assist in his functioning.

The power of administration is diffused among different constituents of administration. The University believes in democratic functioning of administration within the framework provided by the University and Government of Gujarat. The basic structure of administration of organization is decentralized.

The success of the University depends on its decision-making process, strategic planning and teamwork. The Vice Chancellor, Registrar, members of the various committees and Heads of various Departments play a vital role in the entire administrative process. The vital decisions concerning academic and administrative issues are generally unanimous and collective. Each body or units of the University are involved in the decision making process.

COURSES OFFERED AT UNIVERSITY

The University offers Graduate programme in with following Departments.

Sr. No.	Courses offered by University
1	Bachelor of Arts
2	Bachelor of Commerce
3	Bachelor of Business Administration
4	Bachelor of Science
5	Bachelor of Computer Applications
6	Bachelor of Education
7	Bachelor of Education (Special)
8	Bachelor of Medicine & Bachelor of Surgery
9	Master of Arts (Gujarati)
10	Master of Arts (Sanskrit)
11	Master of Arts (English)
12	Master of Arts (Economics)
13	Master of Arts (Psychology)
14	Master of Arts (Sociology)
15	Master of Social Work
16	Master of Labour Welfare
17	Master of Public Administration
18	Master of Commerce
19	Master of Business Administration

20	Master of Science (Chemistry)
21	Master of Science (Environment Science)
22	Master of Science (Geology)
23	Master of Science (IT)
24	Post Graduate Diploma in Computer Applications (PGDCA)
25	Master of Education

2.4 Students, Faculty & Staff Strength

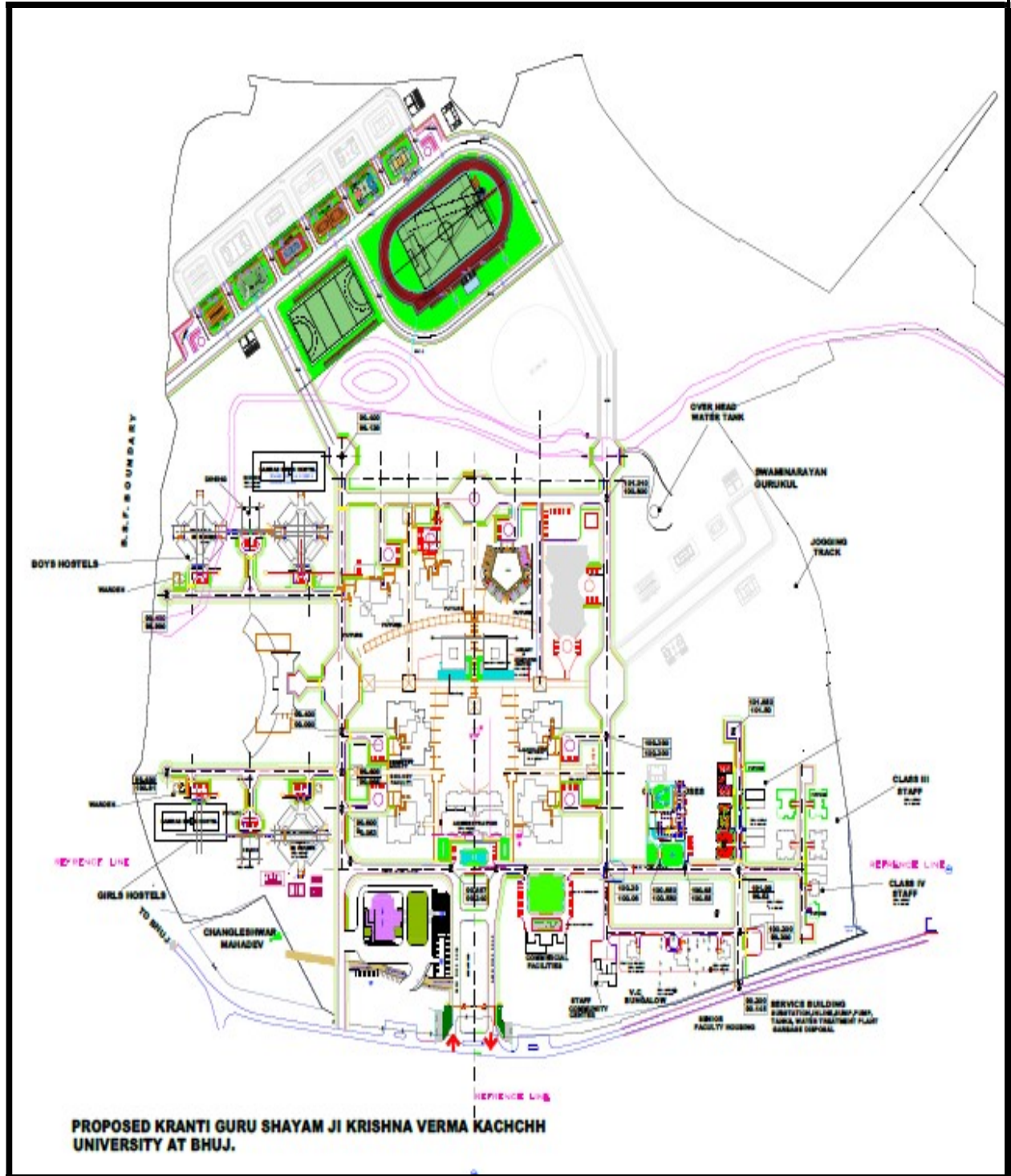
Sr. No.	Programme	No. of Students		No. of Teaching / Admin. Staff including temporary	
		Boys	Girls	Male	Female
1	All Courses	464	898	49	13
		TOTAL-----1424			

This occupancy is required to calculate the potable water required and the likely waste generated on campus.

2.5 Physical Structure & Features

1. The University Campus is spread over 205 acres of land i.e 8,29,606 sq. mt. i.e 89,29,804.67 sq. ft.
2. **The total building footprint i.e Ground floor built up area** on campus is 20,242.55 sq.mt. i.e. 2,17,888.99 sq. ft.
3. **Ground coverage is only 6.80 % against 60% allowable ground coverage as per DCR.**
4. **The total built up area** on the campus is 42,939.04 sq.mt. i.e. 4,62,191.97 sq. ft.

5. **The open play ground area** in form of football/cricket ground and other outdoor games 14,000 sq.mt. i.e. 1,50,694.75 sq. ft.
6. **The total road, parking, walkway and paved area** in the campus is 5,608 sq.mt. i.e 60,364.01 sq. ft. including paved area for parking
7. **The landscape, flower bed, shrubs, tree plantation area** is 3,64,217 sq. mt. i.e 39,20,399.16 sq. ft.
8. **There are about 156 number of two wheelers** of students and staff parked on the campus during working days.
9. **There are about 20 number of bicycles** of students and staff parked on the campus during working days.
10. **There are about 45 numbers of four wheelers** of students and staff parked on the campus during working days.
11. There are about **2700 number of trees** (2000 fully grown trees and 700 semi-grown trees) on the campus with about **56 kind of species**.
12. The University has one LT connection of 54 Kw and it consume on an average 16,000 units per month for interior/exterior lighting and electric equipment system.
13. The University has installed **50 KW of solar roof top** panels, which generates $50 \times 5 \times 30 =$ approx. 7500 units /month and reduces energy bill by proportionately.
14. The University has a facility for continuous **water supply** system. The university meets with its water demand through water bores in the campus.
15. **The University has following facilities and Infrastructure.**
 1. Admin Building
 2. Playground
 3. Library
 4. Computer Centre & 5. Hostel



UNIVERSITY CAMPUS LAYOUT

3. Concept

The term 'Environmental Audit' or 'Green Audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'Environmental Audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters.

Although there is no universal definition of Green Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989). The ICC defines Environmental Auditing as:

A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environmental and natural resources in its operations/projects.

However, the outcome of Green Audit should be established with concrete evidence that the measures undertaken and facilities in the institution under Green Auditing lead to the reduction of Carbon Footprint, which has been historically defines as the total set of greenhouse gas emissions caused by an individual, event or organization and expressed as '***carbon dioxide equivalent***'.

4. Objectives of Green Auditing

The objective of Green Auditing is its most imperative component. A well-defined objective enables the Green Auditor as well as his Team to conduct the auditing without deviating from the focus. Achievement in terms of Carbon Footprint reduction needs to be assessed in both quantitative and qualitative terms.

- To assess whether the measures implemented by the University have helped to reduce the Carbon Footprint.
- To assess whether investments made in increasing awareness among students regarding electricity, biodiversity and environment have helped the University to achieve the required carbon dioxide emission and absorption in the campus.
- To assess whether non-academic activities of the University support the collection, recovery, reuse and recycling of solid waste that harm the environment.
- To identify gaps and suggest recommendations to improve the Green Campus status of the University.
- A 'Green Audit' was conducted by the University which also included a detailed report of waste generated, methods of management and suggestions for improvement.
- Subsequently, Green Protocol was framed and the principles of scientific waste management, namely the '3 R's: Reduce, Reuse, and Recycle' were adopted.
- Green Protocol framed by the University emphasizes prevention/reduction of waste at its source. A number of unique initiatives have been implemented to promote reduction of plastic waste on campus which earned special felicitation from social organizations.

- Replacement of single use plastic in campus and in canteen counters with reusable steel glasses, promotion of cloth bags instead of non-biodegradable rexene bags, encourage the use of steel water bottles and lunch boxes in place of plastic, avoidance of flex boards, plastic files and use of digital display boards during Seminars/Conferences, banning of plastic covering on student projects, encouragement of steel food containers, promotion of green protocol through messages in the campus display board are some of the plastic waste reduction initiatives.
- To promote the principles of 'reuse' and 'recycle', competitions of "Best out of Waste" organized in which the students of the University upcycled into beautiful works of art out of waste materials.
- To identify the usefulness and correct implementation of all the pro-active measures taken by University Administration in various fields including transportation, landscaping, indoor environmental quality, rain water harvesting, ground water recharge, post occupancy waste management system, energy and water conservation/efficiency etc.
- Undertake Water Audit & Energy Audit. Implement corrective measures for Energy and Water Efficiency.
- Introduce innovative approach in form of Zero Discharge Campus, Net Zero Building, and Water Positive Building.
- Develop University campus as a Case Study for students/staff and visitors.
- Finally contribute to the Prime Minister's call for Zero Emission by 2070.
- Recently, Hon'ble Governor of Gujarat State has also emphasized on cleanliness drive and the Higher Education Department of Gujarat State has issued notification for Post

Occupancy Waste Management System functioning effectively in all University and college campuses of Gujarat state.

- The Green and Environment Audit has also incorporated above para in its Report and suggestions and recommendations to be implemented as said.

4.1 Green & Environment Audit Assessment Team

- The University Administration have formed a “**Green & Environment Audit Assessment Team**” to look into the documentation of Green & Environment Audit Report and also to look into the implementation as narrated in the Report and take corrective measures.



CIRCULAR:

Subject: Green & Environment Audit Assessment Team

Vice Chancellor of K.S.K.V. Kachchh University has formed a Green Audit Assessment Team of following members under the Convenorship of Dr. R. V. Basiya to prepare Green Audit Report for Kachchh University.

The Green & Environment Audit Assessment Team is requested to submit draft Green Audit Report for approval.

- | | |
|-------------------------|------------|
| 1. Dr. R. V. Basiya | - Convenor |
| 2. Dr. Subhash Bhandari | - Member |
| 3. Dr. Vijay Ram | - Member |
| 4. Mr. N. K. Ojha | - Member |


Registrar
REGISTRAR
K.S.K.V. Kachchh University
Bhuj-Kachchh

GREEN ASSESSMENT TEAM

5. Methodology Adopted

The methodology adopted to conduct the Green and Environment Audit of the University campus has the following components.

5.1 Onsite Visit

The Green & Environment Audit Assessment Team started the audit at the University during the month of **June, 2019** which extended for about 6 weeks and coming years. Greenhouse gas emission and carbon footprint reduction through adoption of green energy and energy-efficient measures were assessed.

The key focus was on Sustainable Development including Assessing the status of the green cover of the University campus, Water Efficiency, Water Conservation, Rain Water Harvesting, Ground Water Recharge, Energy Efficiency, Energy Efficient lighting fixtures and Equipment Day lighting, Wellbeing of occupants, Indoor Environmental Quality and Post Occupancy Waste Management System.

5.2 Focus Group Discussion & Seminar

The Focus Group included the Green Audit Team assessment members, staff members and officials from management. The discussion was focused in identifying the attitudes and awareness towards environmental issues at the university, district, national and global level. The discussion resolved around following key questions:

- (i) Do the members of the group consider themselves eco-conscious?
- (ii) Do they consider the Institution to be eco-friendly?

- (iii) What do they think are the issues that need to be given top priority?
- (iv) How to develop the campus as Case Study?
- (v) How to motivate and encourage students and staff for Water & Energy Conservation and use it efficiently?
- (vi) How to create awareness amongst students and staff for above said para (v)
- (vii) Can we be the first University in State to introduce “**Green Building**” six months part time **Certificate programme**?
- (viii) How to develop the campus into “**Zero Emission**” campus and be the beginner to fulfil the commitment given by Hon’ble Prime Minister to the world.

6. Carbon Footprint Reduction

6.1 Office / Building Survey

Information on Office-based environmental impacts like built-up area, utility bills, energy-saving devices and IT equipments was collected. This information added to the carbon footprint data, generating a fairly clearer picture of the annual greenhouse gas emissions and impact of the reduction measures undertaken.

6.2 Carbon Footprint

- **Carbon footprints** is historically defined as *the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as **carbon dioxide equivalent**.*
- **Carbon Footprint is measured in tCO₂. tCO₂eq stands for “Tones of CO₂ equivalent”**
- Our '**Carbon Footprint**' is a measurement of all GHG we individually produce to live. The amount of GHG produced depends on our lifestyle and consumption pattern.
- It also depends on how a product is made which we are consuming. If GHG production is more, then we say our carbon footprint is more. If it is less then we say our carbon footprint is small. We should strive to achieve a carbon footprint as small as possible.
- The largest amount of greenhouse gas emission-almost 80%-comes from the energy sector.
- Oil, coal and natural gas- all fossil fuels- supply most of the energy to run vehicles, & generate electricity for industries.
- This sector is responsible for about three-fourth of CO₂ emissions, one-fifth of CH₄ emissions, & large qty. N₂O.

- There are many other sectors such as Agriculture and Animal Husbandry, Deforestation, Waste & Waste water, Residential & Commercial buildings etc. leading to carbon footprint.
- In this report we have concentrated to carbon footprint because of vehicles and electricity consumed and carbon handprint considering landscape, flora and fauna.
- Data collected from the following sources were taken into consideration to calculate carbon footprint emission and reduction. The floristic richness of the campus – total number of plants, trees, shrubs – was estimated. The impact of alternate green energy production and consumption to reduce fossil fuel-based energy was assessed, e.g the number of CFL, LED, tube lights and electronic chokes was counted. The Carbon Footprint Calculator was used to arrive at conclusions.
- Carbon Footprint Calculator enables the measurement of carbon emission by the University. Besides, by Breaking down the value to key ‘carbon drivers’, the University can know how much of carbon footprint comes from which type of behaviour (high power-consuming incandescent bulbs vs. LED lights, solid waste management, etc.).

6.3 Carbon Audit Tools & Analysis

The Carbon Audit tools and analysis methodology were developed collectively and based on that the audit was conducted in major thematic areas.

1. Flora & Carbon Footprint Reduction
2. Sustainable Site
3. Water Efficiency & Water Audit
4. Energy Efficiency & Energy Audit
5. Indoor Environmental Quality
6. Eco-friendly Commuting Practices --Green Transportation
7. Green Construction Material

8. Health & Comfort
9. Post Occupancy Waste Management System

6.4 Flora & Carbon Footprint Reduction

The large area of the University goes live with its green policy. The manifestation of the "Go Green" tree campaign truly finds expression in every nook and corner of the University to a great extent. The University through its efforts towards environmental protection has ensured the plantation and successful maintenance of more than 2700 number of trees ensuring a pristine green cover for the students, faculties, and also for the wildlife that includes animals, birds and reptiles. For the students and for the community at large, a beautiful Garden has also been developed to help the people appreciate the gift of nature, especially during the months of summer. Further, regularly, the campus conducts plantation drive with various stakeholders including the alumni and public representatives. The biodiversity surveys conducted by various departments has documented following flora fauna in campus;

Carbon footprints is historically defined as *the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as **carbon dioxide equivalent**.*

Floristic status of the University

There are 12 families, 25 genera and 56 species of trees, shrubs, herbs (including potted plants) and climbers in the campus.

- 56 species of trees
- 10 species of shrubs
- 20 species of herbs
- 9 species of climbers (including creepers)

About 560 to 700 fully grown trees shall be raised in 1 acre of land. This depends on the type of soil, the species/family of the tree and the spacing. However, with the normal spacing of 6 x 10 feet, the total number of trees shall be taken up as 600/acre. This is a theoretical consumption. The counted number of plants: full-grown trees (above 10 years), semi-grown trees (below 10 years), shrubs and lawn (sq.ft. area).

The following table will illustrate these figures

Sr. No.	Particular of Flora	Designation
1	Full –grown trees	2000
2	Semi –grown trees	700
3	Bushes (including floriculture plants)	500
4	Lawn	39,20,399.16 sq. ft.

Tool to Measure Carbon absorption by flora in the campus

Assumptions

1. Number of mature trees in 1 acre = 700
2. Carbon absorption capacity of 700 trees is equivalent to carbon emitted by a speeding car for 26,000 miles
3. 26,000 miles = 41,843 km
4. Average kilometres covered by a car per litre of petrol is 20 km
5. Total quantity of petrol consumed by the car $(41,843/20) = 2092$ litres

The carbon emitted by a car due to consumption of 1 litre of petrol is 2.3 kg CO₂. At this rate the total quantity of carbon emitted by 2092 litres of petrol $(2092 \times 2.3 \text{ kg}) = 4812 \text{ kg CO}_2$ or 4.8 tonnes of CO₂.

Therefore, the carbon absorption of one full-grown tree is $4812/700 = 6.8 \text{ kg CO}_2$.

The footprint calculation is based on the standard unit of 1 litre petrol = 2.3 kg CO₂.

6.5 Carbon Absorption by Flora

Carbon absorption capacity of one full-grown tree = 6.8 kg CO₂.

- 1) Therefore, the carbon absorption capacity of 2000 full-grown trees in the campus of the University (2000 x 6.8 kg CO₂) = **13,600 kg or 13.6 tonnes of CO₂.**
- 2) The carbon absorption capacity of 700 semi-grown trees is 50 % of that of full- grown trees. Hence, the carbon absorption (700 x 3.4 kg CO₂) = **2,380 kg or 2.3 tonnes of CO₂.**
- 3) There are 500 bushes of various species being raised in the gardens of the University. Carbon absorption of bush plants varies widely according to the species. Certain bushes absorb as high as 49,000 g CO₂. per plant, whereas some others absorb as low as 150 g CO₂ per plant. In the absence of a detailed scientific study and botanical survey, the per-plant carbon absorption was assumed to be 200 g (in consultation with environment scientists). Based on this, the total carbon absorption of 500 plants was calculated to be 500 x 200g = 1,00,000 g or **100 kg or 0.1 tonnes of CO₂.**
- 4) Buffalo variegated grass, Mexican grass and indigenous grass species are being raised and maintained in the lawn. The total area of the lawn is 39,20,399.16 sq. ft. The carbon absorption capacity of 10-sq.ft. area of lawn is 1 g CO₂. Hence, 39,20,399.16 sq. ft. of lawn absorbs **3,92,039 g or 392 kg CO₂. per day.** At this rate, the total carbon absorption per year (392 kg x 365) = 1,43,080 kg or **143 tonnes** per year.

The grand total of carbon absorption by the flora in the Campus is (1+2+3+4) = 159 tonnes.

This is the sink effect of the flora in the campus.

Tool to measure oxygen emission by flora in campus

According to the Arbor Day Foundation, 'a mature leafy tree produces as much oxygen in a season as 10 people inhale in a year'.

A person breathes 7 or 8 litres air per minute. Air is about 20% oxygen. But the exhaled air has about 15% oxygen, and hence the net consumption is about 5 %. Therefore, a person uses about 550 litres of pure oxygen each day.

6.6 Oxygen Emission by Flora

The number of litres in 1 kilogram depends on the density of the substance being measured. Litre is a unit of volume, and kilogram a unit of mass. Litres and kilograms are approximately equivalent when the substance measured has a density of close to 1 kilogram per litre.

On an average, one full-grown tree produces nearly 260 pounds or 117.6 kg of oxygen each year. Two mature trees can provide enough oxygen for a family of four.

- 1) Total oxygen emitted by 2000 full -grown trees per year (117.6 kg x 2000) = 2,35,200 kg or **235.20 tonnes**.
- 2) Total oxygen emitted by semi- grown trees (58.8 kg x 700) = 41,160 kg or **41.16 tonnes** (oxygen emission in 50 % of that of the fully grown trees).
- 3) Total oxygen emitted by 500 bushes is calculated based on the following oxygen -inhaling requirement per person per day. A normal human being requires 550 litres of oxygen per day. 400 bushes produce enough oxygen per day to enable a person to breathe adequate quantity of oxygen of 550 litres. Total quantum of oxygen produced by 400 plants per day is 550 litres of oxygen.

Taking 400 plants as one unit, the number of units of bushes in the campus $(500/400) = 1.25$

Total quantity of oxygen produced by 1.25 units $(1.25 \times 550 \text{ litres}) = 687.5$ litres of oxygen per day.

The annual production of oxygen at this rate $(687.5 \times 365) = 2,50,937.5$ litres or kg of oxygen, which is approximately **250.93 tonnes of oxygen.**

- 4) Lawn is an incredible oxygen –making machine. A 25-sq.ft. area will supply enough oxygen to support one person for a day. Quantitatively speaking, this area of grass produces 550 litres of oxygen per day.

The total area of lawn in the campus is 39,20,399.16 sq. ft. In units, the value $(39,20,399.16/25) = 1,56,815$ units, which produce $(1,56,815 \times 550 \text{ litres of oxygen}) = 8,62,48,250$ litres of oxygen per day. Total quantity of oxygen produced by the 39,20,399.16 sq. ft of lawn per year $(8,62,48,250 \text{ litres/day} \times 365) = 31,48,06,11,250$ litres or approximately **3,14,80,611 tonnes.**

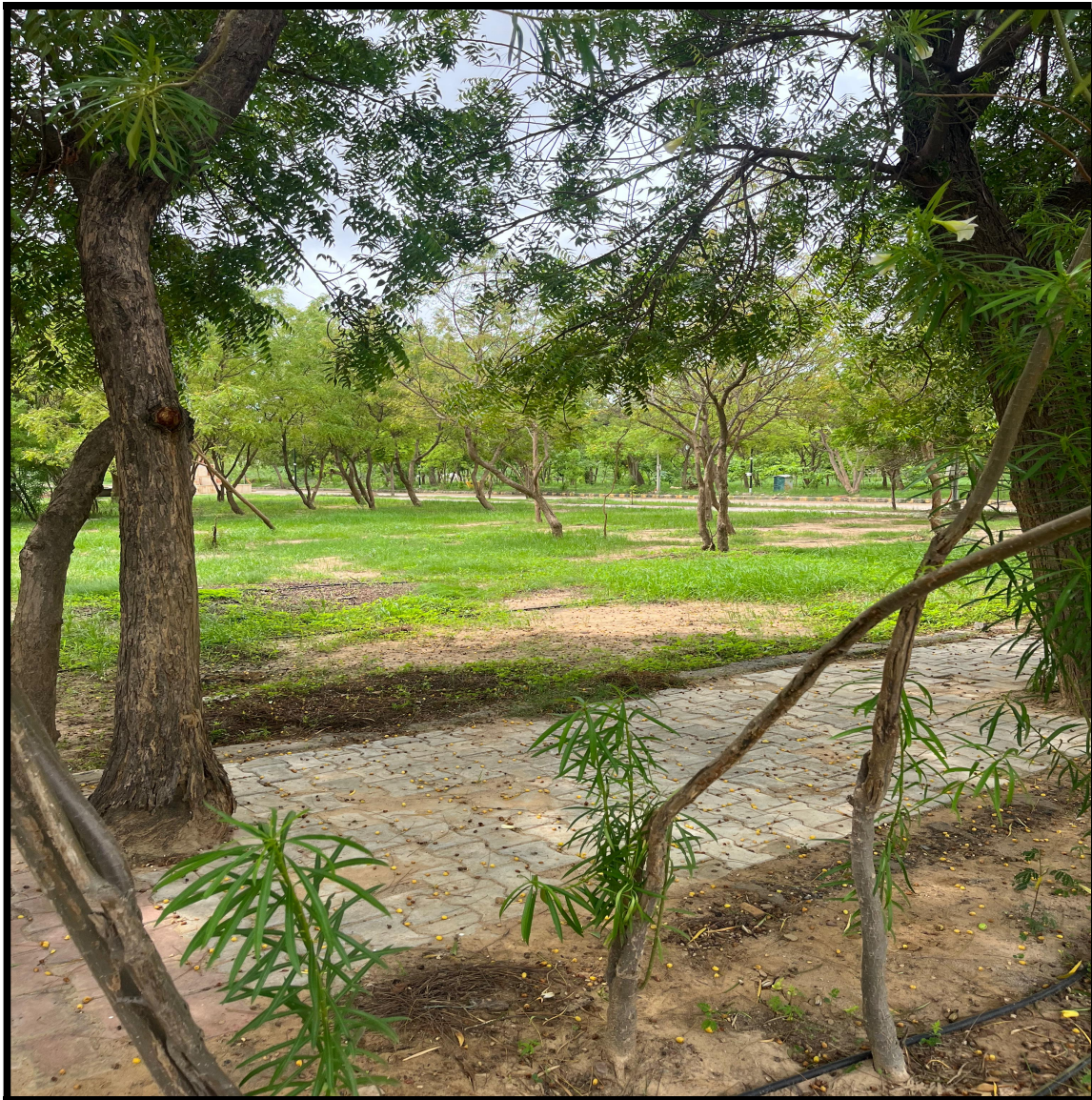
6.7 Carbon Footprint Reduction Table

➤ Carbon dioxide absorption

Sr. No.	Flora	Quantity of CO ₂ (tonnes)
1	2000 Full –grown trees	13.6
2	700 Semi –grown trees	2.30
3	500 Bushes	0.10
4	39,20,399.16 sq. ft. Lawn	143
	Total	159

➤ **Oxygen emission by flora**

Sr. No.	Flora	Quantity of O ₂ (tonnes)
1	2000 Full –grown trees	235.20
2	700 Semi –grown trees	41.16
3	500 Bushes	250.93
4	39,20,399.16 sq. ft. Lawn	3,14,80,611
	Total	3,14,81,138.29



GREEN COVER ON CAMPUS



GREEN COVER ON THE CAMPUS





GREEN COVER ON THE CAMPUS



7. Energy Efficiency

Energy conservation is the utmost important in Green & Environment Audit. Entire Nation and all States of our country are canvassing and encouraging people of India to save energy. We are falling short of energy as compared to its generation and usage.

Ministry of New and Renewable Energy, Government of India of India is promoting use of Green and Hybrid Energy. Government of India has come up with ECBC code-2005 revised in 2017 with amendment in 2022. All Public buildings, Institutions, Commercial complexes, Factory buildings Residential complexes have to follow ECBC-2017 norms.

University has taken a pro-active step of procuring LED lighting fixtures and BEE star rated electrical equipment and ceiling fans for all its spaces. This has been done even before the Green & Environment Audit could take place. University has a good practice to purchase and install only LED lighting fixtures and purchase all equipments of BEE star rated.

7.1 Implementation of ECBC/ASHRAE/LPD Norms

The University has yet to undertaken Energy Audit for its campus Building, which should be taken up soon.

Even then University Administration has taken up series of steps to reduce the energy consumption on the campus. University has taken a policy decision to install LED lighting fixtures only and purchase all electric equipment with minimum BEE 3 Star Rating.

The University has further taken a decision to retrofit its buildings as energy efficient / green buildings and construct all its new buildings as energy efficient / green buildings.

The University designs the building to comply with Energy Conservation Building Code (Revised Version May, 2017) (or) ASHRAE Standard 90.1-2010 (without amendments) through one of the following approaches:

Performance based approach (Whole building simulation) OR Prescriptive approach. Energy Efficient Buildings have savings over more than 40% in electric consumption over ECBC norms or ASHRAE norms. The University confirms that the total annual energy consumption of the building should not exceed the total base case energy consumption computed, as per ECBC (or) ASHRAE Standard 90.1-2010.

The Lighting Power Density (LPD) in the building interior, exterior and parking areas are reduced by minimum 10% over ECBC base case.

Compliance for the lighting power density is shown either through 'Building Area Method' or 'Space Function Method'. Exterior areas illuminated by lighting only is considered for lighting power density calculations. The LPD includes power consumption of complete fixture, including lamps and ballasts

7.2 Total Energy Consumption & Equivalent CO2

The data based on electrical bills collected from University reveals that the total Electrical energy units consumed on Campus per month is approx. **16,000 (KWh)**. This includes **air conditioners**, which consumes about **50%** of electricity

Hence total annual energy consumption is $16,000 \times 12 = 1,92,000$ units per annum.

One Unit equals 1000 watts (1KWhr.) It requires 0.538 Kg or approximately $\frac{1}{2}$ Kg of coal to produce 1 unit of electricity.

Total quantity of coal required to produce **1,92,000** units of electricity is $(1,92,000 \times 0.538 \text{ Kg coal}) = 1,03,296 \text{ Kg}$ or 103 tons of coal.

Co₂ emission by coal

One Kilogram of coal emits 2.86 Kg. of CO₂ thereby increasing the carbon footprint which in turn contributes to global warming.

Therefore 103 tons of coal consumed indirectly by the University through consumption of 1,92,000 units of electricity led to the emission of $(1,03,296 \text{ Kg of coal} \times 2.86 \text{ Kg CO}_2) = 2,95,426.56 \text{ Kg}$ or **295 tons of CO₂ the atmosphere.**

7.3 Solar Panels on Grid

The University has installed 50 KW solar panels and this has offsets entire energy consumption on the campus.

These Solar panels are connected to Grid through Net Metering and hence the cost of batteries to store solar energy generated is saved. Furthermore, these batteries are harmful to environment.

These solar panels generate 50 Kw per hour, however the panel will function effectively only for about 5 hours per day. Hence total solar energy generated per day will be $50 \times 5 = 250 \text{ Kw/day}$

Total solar energy generated per year will be $250 \text{ Kw} \times 365 = 91,250 \text{ Kw}$.

The coal equivalent $91,250 \times 0.538 = 49,092.5 \text{ Kg. coal}$.

The CO₂ equivalent is $49,092.5 \times 2.86 = 1,40,404.55$

$1,40,404.55 \text{ Kg} = 140.40 \text{ tons}$

Hence Co₂ reduction because of proposed solar panels on the campus is 140.40 tons.

Hence the University has contributed towards reduction of 25% emission due to consumption of energy & also contributed towards Zero Emission Policy of Nation.



SOLAR PANELS OF 50 KW ON-GRID i.e. NET METERING

7.4 Energy Efficiency & Conservation

University building has air-conditioners, which confirms and considers unitary air-conditioners with BEE 3-star rating.

University verifies and ensure that the building's equipment & systems are commissioned to achieve performance as envisaged during the design stage. University is also proposing to submit measurement & verification plan for yearly reporting.

All Lighting fixtures are LED. All electrical equipment are minimum BEE 3 Star Rated. All ceiling fans are BEE

star rated. Proper signages are not placed of Save Energy and Put Off lights when not in use.

The University has installed energy efficient pumps. The building design is such so as to attract maximum daylighting, which reduces artificial lighting load during daytime.

The University has not placed proper signages to **“Save Energy”** and other similar kind of signages at all class rooms and wash rooms to motivate and create awareness amongst students and staff to save water



**ENERGY EFFICIENT LED LIGHTING FIXTURES &
CEILING FANS**



ENERGY EFFICIENT SPLIT AC



BEE STAR RATED LED TV



BEE STAR RATED REFRIGERATOR

7.5 Outdoor Light Pollution Reduction

Light pollution on the campus is reduced to increase night sky access and enhance the nocturnal environment. Exterior lighting are designed such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir (straight down). LED lights are not used for exterior lighting system, which is the improper way of energy efficient steps.

The center-to-center distance between exterior lighting electric poles and their height is calculated so as to avoid any overlap of night light and also to lit only drive way. The bracket and the angle of bracket also play an important role for the same. Finally, the lighting fixture is selected so as to illuminate only drive way.



REDUCE NIGHT LIGHT POLLUTION BY PLACING LED



7.6 Energy Performance Index

Energy performance index (EPI) is total energy consumed in a building over a year divided by total built up area in kWh/sq m/year and is considered as the simplest and most relevant indicator for qualifying a building as energy efficient or not.

EPC ratings are given to properties and are represented on a scale from A (most efficient) to E (least efficient). The EPC contains information about a property's energy use and typical energy costs, as well as recommendations about what you can do to save energy at home and make your property cheaper to run.

Enhance energy efficiency of the building to reduce environmental impacts from excessive energy use

EPI range for buildings having less than 50% occupied area as air conditioned (kWh/m²/year) IS 75-65 for Hot & Dry climate zone. This value is applicable only for day use office buildings which operate for 260 to 300 days in a year.

Electricity consumption details including utility power, captive generation and renewable energy of preceding 1 year

The total annual energy consumption is 1,92,000 kWh

The total Built up area is 42,939.04 sq.mt.

Hence EPI = 1,92,000/42,939.04 = 4.47 kWh/m²/year, which is far below the given limit.

8. Eco-friendly Commuting Practices

Eco-friendly commuting practices can also be termed as Green Transportation.

Emission of CO₂ through transport system – both public and private – is very high in India as India is credited with the third rank in carbon emission in this regard. It is estimated that in India, 9% of the total carbon is emitted by the transport system.

The University Management has taken a principle stand right from the beginning to encourage students to use the public transport system or walking or use bicycle to reduce carbon emissions.

Unfortunately, after globalization, there has been a continuous increase in the income of the 100 million plus middle class families along with the automobile boom. As a result, the student community and teaching faculty members of the University are using two wheelers and four wheelers in large numbers and the trend has been on the increase. This is inspite of creating awareness to use public transportation or bicycle or walking. Hence it is appropriate, in this context, to analyze the carbon dioxide emissions from the fleet of four wheelers and two wheelers owned by the individuals even though the University does not pollute the atmosphere directly.

The University Management has been successful to convince students and staff to commute in public transportation and hence it is a great achievement for the University that not more than about 115 numbers of two wheelers and not more than 15 numbers of four wheelers reach University daily and this figure includes vehicles used by teachers and administrative staff along with the visitors.

8.1 Vehicles on the campus & it's carbon emission

The following data indicate the quantity of diesel consumed by the vehicles during the last year. There are 45 numbers of four wheelers, and 156 two wheelers used by students and staff. It is appropriate to calculate the petrol consumption separately for four wheelers and two wheelers. The survey conducted among students / staff who own two wheelers reveals that they use the vehicles not only for visiting the University, but for moving after campus hours and holidays. It is estimated that the average mileage covered by each staff / student is about 30 km/day. The total mileage covered by the 156 two wheelers per year ($156 \times 30 \times 365$) = **17,08,200 km.**

Apart from that 45 numbers of four wheelers are used by the students / faculty members and the average mileage covered is also the same, 30 km per day. Hence the total mileage covered by 45 numbers of four wheelers per year is ($45 \times 30 \times 365$) = **4,92,750 km.**

The total mileage covered by two and four wheelers per year ($17,08,200 + 4,92,750$) = **22,00,950 km.**

The fuel consumption by vehicle is determined by the type of vehicle, year of manufacturing, maintenance status, traffic system of the particular area, etc. High-end and medium- range bikes consume different quantities of petrol. However, for the sake of convenience, 35 km per litre is taken as the standard to calculate the carbon emission of two wheelers. Based on this, the total quantity of petrol consumed for covering 17,08,200 km is ($17,08,200/35$) = **48,806 litres**

A medium-range four wheelers covers 16 km per litre of diesel. Based on this the total quantity of diesel consumed by 45 four wheelers per year ($4,92,750/16$) = **30,796 litres**

Thus, the total fuel consumption per year (48,806 + 30,796) = 79,602 litres (both petrol and diesel).

Conversion table to calculate carbon emission by vehicle per litre is very complicated in view of the local variable to be taken for calculation.

Instead, a simple but universally accepted calculation calendar for various types of fuels and their CO₂ conversion rate was adopted.

As per this calculation calendar, combustion of 1 litre of diesel/petrol leads to the emission of 2.68 kg of CO₂. At this rate, the total quantity of CO₂ emitted by 79,602 litres of fuel (79,602 x 2.68) = **2,13,333.36 kg = 213 tonnes.**

The carbon emission into the atmosphere is 213 tons because of vehicles moving on the campus and for education purpose out side the campus.

Considering this emission of the CO₂, the University has intensified green awareness among the students and through green education on the one hand and plans to mitigate carbon emission from vehicles on the other.

The University management has motivated and encouraged all students and staff is to use public transportation, cycle, walking, and further discard use of personal vehicle in order to reduce CO₂ emission and fuel consumption and convert the campus into ***Zero Carbon Campus.***

The University has also encouraged green transportation i.e. encourage students and staff to pool car and two wheelers. Discard use of even public transportation and reach walking if the University premise is within 2 to 3 Km radius.

8.2 Parking Facility & Regulations

The University campus has a parking shed for limited vehicles only. This is in order to discourage bringing vehicles on the campus. The parking shed adds to heat island effect roof. The trees are used as shading devise to

park vehicles. This also saves the cost of parking shade and further reduce heat island effect roof. The trees act as evaporative type of cooling system for the campus.

All the vehicles are parked in orderly manner within the campus.

Green Transportation is also the need of the hour considering rapidly depleting oil reservoirs and India is dependent on overseas to meet with its oil demand and in return lose valuable foreign currency reservoir.

Implementation of Green Transportation on the campus can reduce number of vehicles on the campus and also eased down parking issues.



PARKING FACILITY ON THE CAMPUS



PARKING UNDER THE TREES



9. Sustainable Development

9.1 Green Policy

The Green Policy on campus is in existence. Actions are taken to encourage and motivate students and staff to adopt eco-friendly approach and save electricity, save or conserve water, save paper and use dust bins. Students and staff are informed and warned against smoking and chewing tobacco. The best way of doing it is through signages and official circular/notification and this has been done by University by issuing official notification.

University Management has not placed proper signages in this regard but more proper signages are to be placed to make the policy more effective and convey the message to each and every student at each and every corner of the campus.

University must have a policy to implement Green Building norms by retrofitting all existing buildings as Green / Energy Efficient buildings. Constructing all buildings with green building norms incorporated in its design.

9.2 Best Practices & Initiatives

The University Administration & Management always believes in taking proactive steps and initiatives not only from Green & Environment Audit point of view but also in view of sustainable development and also imparting ease, comfort and healthier environment for the staff and students.

The University Administration have issued circulars/notifications to ban use of “Single Use Plastic” and another circular/notification to use Water and Energy Efficiently, Ban Chewing Tobacco and Smoking on campus and many more.



Krantiguru Shyamji Krishna Verma
KACHCHH UNIVERSITY

Mundra Road, Bhuj - Kachchh. 370 001
Email- registrar@kskvku.ac.in

Phone No. (02832) 235 002
Web-http:// kskvku.ac.in

Ref.No: KU/Plastic-Circular/
Mundra Road, Bhuj.
Date: 25/04/2022

CIRCULAR:

Subject:- Ban on Single use Plastic

Reference: Central Pollution Control Board Notification No.B-17011/7/PWM/2022,dated:4-2-22

The University Administration has taken a decision to BAN Single use plastic on the campus and all affiliated Colleges are requested to follow the same on their respective campus too.

This decision is taken considering directives of Central Pollution Control Board to implement a blanket ban on certain single-use plastic items from 1st of July, 2022. Copy is attached for ready reference

Plastic pollution harms our health, wildlife and the environment and attracts significant clean-up costs. Many single-use plastic items are difficult and economically unviable to recycle. Often, they end up contaminating our recycling.

Hence disposable water bottles, soft drink bottles, plastic carry bags, single-use plastic straws, stirrers, cotton buds.


Let us take steps to reduce plastic use by promoting the use of biodegradable alternatives that are relatively less harmful to the environment. Let us involve all students, Teachers and Staff for promoting this initiative to protect Environment, Human-beings, Birds and Animals.

Please paste signage at various places on the campus to promote ban of "Single use Plastic"

Cc: 1. The Head of Department, P.G. Department, Kachchh University-Bhuj.
2.The Principal, Affiliated Colleges, Kachchh University, Bhuj.


Registrar
REGISTRAR
K.S.K.V Kachchh University
Bhuj-Kachchh

CIRCULAR ON BAN ON SINGLE USE PLASTIC


Krantiguru Shyamji Krishna Verma
KACHCHH UNIVERSITY

Mundra Road, Bhuj - Kachchh. 370 001
Email- registrar@kskvku.ac.in

Phone No. (02832) 235 002
Web-http:// kskvku.ac.in

Ref .No: KU/Tobacco-Circular/
Mundra Road, Bhuj.
Date: 23 | 03 | 2020

CIRCULAR:

Subject:- Tobacco Free Campus
Reference:- Government of Gujarat General Administration Department Notification No. PRCH/102012-546246-2 dated 4-9-2012 (Copy is attached)

The University Administration has taken a decision to strictly implement and follow the directives of Government of Gujarat to BAN "Smoking & Chewing Tobacco" on the campus and all affiliated Colleges are requested to implement this policy of Government strictly in letter and spirit. Copy of Government Notification under reference is attached for ready reference.

A tobacco-free policy limits or eliminates the use of any tobacco product, including, but not limited to, cigarettes, cigars, cigarillos, mini-cigars, hookah, spit tobacco, snus, and other smokeless products.


This decision is considering the lenient follow up on Government Policy to make all educational campus as "Tobacco Free" campus.

Tobacco is known to be harmful to the health of smokers, bystanders, and the environment.

Let us come together and make our campus "Tobacco Free"

Let us involve all students, Teachers and Staff for promoting this initiative to protect good health of all those using Tobacco.

Please paste signages at various places on the campus to promote "Tobacco Free" The Workshop, Seminars and Debate can be organized with a subject of "Tobacco Free Campus"


REGISTRAR
K.S.K.V Kachchh University
Bhuj-Kachchh

Cc: 1. The Head of Department, P.G. Department, Kachchh University-Bhuj.
2.The Principal, Affiliated Colleges, Kachchh University, Bhuj.

CIRCULAR ON TOBACCO FREE CAMPUS

9.3 Heat Island Reduction--Roof & Non-Roof

The elevated temperature in urban areas as compared to rural, less developed areas is referred to as the urban heat island effect. As cities grow and develop, more buildings and people are added. The process of urban development leads to this phenomenon. Heat Island Effect is the **"Thermal Gradient Between Developed & Undeveloped Spaces"**

When urban and suburban areas lose land surface and naturally occurring vegetation, heat can no longer easily escape. Tall buildings, concrete, and asphalt trap heat and contribute to the warming effect. Waste heat from energy use is another source of additional heat. Other contributing factors include local weather, seasonal changes, time of day, and geographic location.

There are three basic types of heat islands: canopy layer, boundary layer, and surface. Both canopy layer and boundary layer heat islands refer to atmospheric heating (warmer air temperatures). Surface heat islands refer to the actual temperature of surfaces in a specific heat island. Although the timing and intensity of these types may vary, they can all be harmful to urban and suburban environments.

Roof top is the major source of solar heat ingress inside the building. About more than 45% to total solar heat ingress inside the building is through roof top. Hence University has approach to minimize heat island effect so as to reduce negative impact on micro-climate. University makes use of material with a high solar reflective index or china mosaic on roof top to cover exposed roof area, including parking under the shading of trees.

University has policy to lay only china mosaic tiles on the roof top. This has also reduced Heat Island Effect-Roof. Photographs are enclosed.

The solar panels on roof top further prevents solar heat ingress inside the building.



HEAT ISLAND EFFECT ROOF--CHINA MOSAIC ON ROOF TOP

Heat Island Reduction—Non-roof

All attempts are made to minimize heat island non-roof effect so as to reduce negative impact on micro-climate. University has building footprint of less than 10% and a small area is paved for road, walkways and parking. Hence more than 70% of plot area is retained undisturbed and a large part is with thick vegetation and more than 2700 numbers of trees, bushes, creepers etc. assisting to create comfortable micro climate.

The surrounding open space around the buildings has been laid with open jointed paver block/ stone tiles. Even well grown trees are preserved or saplings planted surrounding the building to act as shading device.



***HEAT ISLAND EFFECT NON-ROOF-----
SHADED BY TREES***

9.4 Building Operation & Maintenance

The University undertakes regular maintenance of building and also cleanliness with the cleanliness drive.

The University Authority has entered into Annual Maintenance Contract for Air Conditioners, Water coolers, ceiling fans, printers, water pumps, water fixtures, energy equipment, DG set etc. This is required to keep these electric equipments to operate efficiently consuming optimum energy for which they are designed and prevent leaking water supply fixtures and cocks.

This also falls under the Maintenance Policy of the University

9.5 Designed for Differently Abled

The University has ensured that the building/ campus design caters to differently abled people. Circular has been issued to all concerned to follow Government directives to make building use friendly for Divyang.

University follows design manual for a barrier free built environment i.e Universal design Design for differently abled people in accordance with the guidelines of National Building Code (NBC) of India and “Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1996 enacted by the Government of India on January 1, 1996 to create barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream.

University has identified all probable facilities required to cater to differently abled people. University has also ensured that certain basic minimum provisions for differently abled people are *PROPOSED* which are as below.

- Easy access to the main entrance of the building.
- Non-slippery ramps with hand rails on at least one side.
- Main entrance door with adequate width.
- Uniformity in floor level for hindrance-free movement.
- Preferred parking for differently abled persons
- Lift
- Wash rooms for Divyangs

Facilities available for Divyangjan



Facility of Wheel chair for Divyangjan



Special Open Source Software For Reading And Writing



Accessible Toilet Blocks



Ramp for Wheelchair



RAMPS WITH RAILINGS

9.6 SUSTAINABLE DEVELOPMENT AWARDS & APPRECIATION

The University is recently established and has already started working on various following subject matters pertaining to Sustainable Development.

- Net Zero Building
- Zero Emission Campus
- Zero Discharge campus
- Green Building Certification from IGBC or GRIHA
- Green Transportation
- Improving microclimate of the campus
- Improving Energy Performance of the Buildings
- Strengthening facilities for Divyangjan
- Improving Indoor Environmental Quality

After achieving desired results on the above said development, University will apply for the Awards & appreciation alongwith Reorganization so that the students and staff of the University get motivated to do still better in the field of Sustainable Development.

10. Water Efficiency

10.1 PRESENT SCENERIO

The University campus meets with its water supply requirement through existing ground water two bores and municipal water supply.

The bore water is used through RO system for potable purpose.

The University consumes 70000 litres daily for potable use & for landscape purpose.

Water Supply System Overview

The water supply system for university campus is designed to ensure a consistent and reliable source of water for all needs. This system utilizes a bore well as the primary water source, which is an efficient method for accessing underground water.



Bore Well



(a) Water Extraction from Bore well

The process begins with the bore well, which is drilled into the ground to access the aquifer. This bore well is equipped with a submersible pump that draws water from underground. The extracted water typically contains various minerals and impurities, making filtration essential for ensuring its safety and quality.



FILTRATION TANK

(b) Filtration Process

Once the water is drawn from the bore well, it is directed into a filter tank. This tank is equipped with filtration systems that remove sediment, dirt, and other particulate matter. The filtration process is crucial for improving water clarity and quality, making it suitable for consumption and use in various university facilities. Regular maintenance of the filter tank is essential to ensure that the filters remain effective and that the water quality meets health and safety standards.



UNDERGROUND TANK

(c) Storage in Underground Tank

After the water has been filtered, it is transferred to an underground storage tank. This tank serves as a reservoir, storing large quantities of filtered water for use during peak demand periods. The underground tank helps maintain a stable water supply, ensuring that there is always enough water available for the campus community.



OVERHEAD TANK

(d) Pumping to Overhead Tank

From the underground tank, water is then pumped to an overhead tank using a motorized pumping system. The overhead tank is strategically located to utilize gravity for distributing water throughout the campus. This elevation allows for efficient water flow to various buildings and facilities without requiring additional pumping energy.

(e) Gravity Distribution System

Once the water is stored in the overhead tank, it is distributed throughout the campus via a gravity-fed system. This method relies on the natural force of gravity to supply water to different areas, minimizing energy consumption and reducing operational costs. The gravity distribution system is designed with a network of pipes that lead to various locations on campus, including academic buildings, dormitories, and recreational facilities.

(f) Monitoring and Maintenance

To ensure the water supply system operates efficiently, regular monitoring and maintenance are conducted. This includes checking the borewell's performance, cleaning the filter tank, inspecting the underground and overhead tanks for leaks or damage, and ensuring that the pumps are functioning correctly. Any issues are addressed promptly to prevent disruptions in water supply.

(g) Sustainability Practices

In addition to maintaining a reliable water supply, the university is committed to sustainable water practices. Efforts are made to conserve water, reduce waste, and implement rainwater harvesting systems where feasible. These practices not only help in managing resources but also promote environmental stewardship within the campus community.



WATER COLLER WITH FILTRATION FACILITY

10.2 WATER EFFICIENT FIXTURES

The plumbing fixtures installed are not water efficient. Water efficient plumbing fixtures need to be installed to enhance water use efficiency and minimise the use of potable water on campus. No leakages are observed in installed fixtures. No wastage of water is observed. No leaking conduits are observed. No wastage of water in landscape is observed.

The University must place proper signages to **“Save Water”**. University need to install signages at more places to motivate and create awareness amongst students and staff to save water.

Saving of water also leads to saving of energy because the less water we use, lesser energy is required to pump lesser water. Ground water table do not deplete fast and hence we require lesser HP motor to pump water requiring lesser energy.

10.3 RAIN WATER HARVESTING & GROUND WATER RECHARGE

University has a large campus with open grounds, gardens and rooftop area. Following methods are adopted by the University for ground water recharge;

- The large open space of the campus acts as percolation tank and most of the rain water gets percolated through this open spaces.
- Rain Water Harvesting



Rain Water Harvesting is done in Open Well

10.4 LANDSCAPE DESIGN & MANAGEMENT OF IRRIGATION SYSTEM

The University campus has not installed any water efficient irrigation system. Conventional type of stand posts exists which lead to wastage of water and un-necessary flooding. The water efficient irrigation system in form of sprinklers, drip irrigation, root zone treatment, moisture sensor, each type of bedding areas are segregated into independent zones based on watering needs etc can reduce potable water demand on the campus.

10.5 WATER Metering

The University has not installed any water meter at any place. The water meters are to be installed soon to measure consumption of water at various locations such as irrigation, potable, flushing etc.

10.6 WATER AUDIT

The word Audit is a term related to accounting system. Off late Energy got scarce and costlier commodity. Hence Energy Audit was introduced. The water was in abundant and one never thought it to be scarce but then we have reached to a stage where auditing of water is also required.

Water Audit---Objectives & Benefits

Water Audit is Qualitative & quantitative analysis of water consumption to identify means for Reducing, Reusing & recycling of Water. It provides the information of water wasted and offers ways to conserve it.

“WHAT GETS MEASURED GETS MANAGED!”

A water audit is an accounting procedure. The purpose of water audit is to accurately determine the amount of unaccounted-for water (UAW) in a water distribution system. UAW is calculated from verified supply and consumption records, factoring in various estimated usage figures. Water audits helps us to identify usage habits, as well as pinpointing leaks and other waste so that one can conserve and save. It helps us to know about detail profile of distribution system & water users. It also works on for the implementation of water loss reduction plans and important steps towards water conservation. There are various types of water audit and the present water audit falls under the category of Institutional and Domestic type.

(a) Objectives of water Audit

- (i) To utilize water resources more effectively and efficiently.
- (ii) To keep check on unwanted excess usage of water.
- (iii) Helpful in planning develop a water storage structures like ESR, sumps, dams, ponds, bunds, etc.
- (iv) For cost-benefit study for optimum recovery of water loss.
- (v) To identify thefts, meter inaccuracies, record inaccuracies and unauthorized water use.
- (vi) To determine losses both physical & non-physical.
- (vii) To identify priorities area which need immediate attention for control & maintenance
- (viii) Estimation of waste water generated
- (ix) Estimation of water pollution load

(b) Benefits

- (i) Reduced water losses
- (ii) Improved financial performance
- (iii) Improved reliability of supply system

- (iv) Enhanced knowledge of the distribution system
- (v) Efficient use of existing supplies
- (vi) Better safeguard to public health and property
- (vii) Improved public relations
- (viii) Reduced legal liability
- (ix) Reduced disruption, thereby improving level of service to users.

11. Post Occupancy Waste Management System

People think trash goes away when they get it out of their house---out of sight, out of mind. But they don't realise that it's adding to the load of Earth by going into landfills. Management of solid waste is an important driver in Green Audit. Solid waste not properly managed leads to the degradation of the environment which, in turn, affects the flora and fauna. Keeping this in mind, the University has been strictly implementing scientific solid waste management to maintain the green status of the campus.

Segregate building waste at source and facilitate proper disposal for recycling, thereby avoiding such waste being sent to landfills. It was observed that Post occupancy waste Management system still needs lot of improvement. Dustbins are placed at various places on the campus but effective steps are required for the segregation of waste.

Solid Waste Management

University emphasis on paperless office and reduce the use of plastic on campus. Each classroom, hall, lobby, office, canteen, library is provided with dustbin which is regularly emptied. Waste is segregated as biodegradable and non-biodegradable at different collection points by the housekeeping staff and accumulated at a central collection point. Segregated wastes must be dumped into the particular dustbins of green, blue and red. Green coloured dustbin are meant for liquid and biodegradable waste. Red dustbins are meant for disposal of non-biodegradable waste. Blue dustbins are used for papers and glass materials.

The University efforts to decrease the waste production and works strongly on the policy with IQAC and open discussions.

The University possesses a vibrant and ecologically conscious campus community as a result of which the campus is deemed as a Zero Waste generator campus. The modus operandi

consists of a systematic segregation of waste owing to its characteristic feature of bio degradable and non-degradable. Further the campus also plans to install Bio-composting machine and also undertakes vermicomposting for waste management. A major contribution in ensuring a waste free campus is of the house keeping staff which regularly engages in the cleaning of the campus and as part of **Swachh Bharat Abhiyan**, the campus community also conducts cleanliness drive for the campus.

1. **Segregation of waste and Dustbins:** The waste generated in the university is segregated in biodegradable and non-biodegradable waste in the waste pits. The biodegradable waste is converted into fertilizer and used in the campus garden.

2. Waste disposal sites & Bio-composting

Waste collection and Segregation:

Segregation of waste and Dustbins: The University building corridor must place 3 different dustbins at several places. The campus has a dedicated area for waste disposal and segregation. Waste is collected from campus complex by the cleaning staff and transferred to waste segregation centre. The waste generated in the university is segregated in biodegradable and non-biodegradable waste in the waste pits. The biodegradable waste is converted into fertilizer and used in the campus garden. The non-biodegradable waste is sent to recyclable industry.



***DIFFERENT DUSTBIN PLACED FOR
SEGRATION OF WASTE***



COMPOSTING PIT



Biogas

Reduction of waste at point:

Adopting Digital mechanism: The University is in line with green initiatives has moved to digital governance. Use of emails and website for student and staff notices and correspondence are promoted to ensure low use of papers.

E Waste:

The consumption of electronic goods and equipment are put to optimum use by proper upgradation and regular maintenance. For the professional and regular maintenance and disposal of e-waste, University has collaborated with local service provider. Periodic checking ensures that nonworking and defective equipment are disposed-off properly as per the directives of Government.

Hence the University has properly segregated the waste and sending this waste to recyclable industry instead of sending it to landfill sites.

This has earned some financial benefit for the University and has also prevented landfill site from overburdened and also saved transportation cost and Co2 emission through transportation.

12. Indoor Environmental Quality, Health & Comfort

12.1 Tobacco Smoke Control

It is proposed to minimize exposure of non-smokers to the adverse health impacts arising due to passive smoking in the building.

Well, the smoking is prohibited in educational institutions even then University have to placed signage at places on the campus to convey that Smoking / tobacco chewing is prohibited and injurious to health. Well, there is Government ban on Smoking in public places but this has to be displayed at various places.

12.2 Fresh Air Ventilation & Daylighting

The University building is designed to provide adequate outdoor air ventilation so as to avoid pollutants affecting indoor air quality. The building is constructed with a view point of ratio of openable area to the carpet area which is at least 6% in each regularly occupied zone. It is observed that window to wall ratio is more than 40% and entire one side of passage is open. The class rooms are designed to have adequate ventilation and cross ventilation and even enhanced ventilation.

The rows of window in class room gives abundant ventilation and cross ventilation and the occupants feel more comfortable, which is extremely important feature of Indoor Environmental quality.

It is also advised to all concerned to keep all the windows open during conducting class to have ventilation, cross ventilation and even enhanced cross ventilation. This will improve Indoor Environmental Quality of the building. This will lead to more comfort and increase efficiency of teacher to deliver the best and students to accept the most with an ease.

Building design ensures connectivity between the interior and the exterior environment, by providing adequate daylighting.

The buildings are designed to achieve minimum glazing factors as below in at least 50% of the regularly occupied spaces.

It is ensured that daylighting is considered at the design stage only by appropriate orientation. The orientation of the buildings is kept such that maximum daylighting to all the spaces is achieved during most part of the day.

While designing for daylight, care is taken to control glare which causes discomfort. Strategies include building orientation towards the north, appropriately designed windows to ensure adequate daylighting, double height roof, etc. The University has ample of open space and hence the University can afford to orient new proposed buildings in desired side easily.

University is advised to keep window shutters open and this will allow good amount of daylighting inside the room. Good amount of daylight will prevent active lighting during day time and we can also save upon energy part.

12.3 Well-being facilities / Health & Comfort

Facilities are to be provided so as to enhance physical, emotional & spiritual wellbeing of building occupants. Common room for ladies and gents is provided

Indoor games facilities are also provided along with out-door games facilities.

Such activities will divert students to waste their time in other unfruitful activities during leisure time.

Meditation / Prayer is mandatory at start of the day in many Corporate Offices. Employees go for mediation to ease down their stress and pressure of work.



LIBRARY



INDOOR GAMES



INDOOR GAMES





OUTDOOR GAMES



STUDENTS WELL-BEING

At University, student care and well being is the core focus. University has a non-compromising outlook towards their security and health that is evident through on-campus clinic, intensive security measures and comfortable accommodation facilities.

MEDICAL FACILITY

The University invites consulting doctors at regular interval for any health-related problems. The doctors are available on the campus during given time and also online consultation can be availed.

SECURITY

The University has a very vigilant and professional security arrangement and all students and staff feel to be in safe hands.



Security at Entrance of University



Security at Hostel

HOSTEL ACCOMODATION

This may be your first time living away from home. Student accommodation will allow students to enjoy their new-found independence in safe and welcoming surroundings. Hostel accommodation is comfortably furnished and is fully equipped with everything you need.

With a range of room prices and options, the on-campus accommodation is extremely popular. University has a fantastic student community, making it a very sociable place for prospective students. The on-campus accommodation comes with a whole package of neat rooms, in-house dining, canteen, room service, study rooms and overall a peaceful environment.



CANTEEN



POST OFFICE IN UNIVERSITY



YOGA DAY



CLEANLINESS DRIVE



TREE PLANTATION



WORKSHOPS ON GREEN INITIATIVES

The University needs still regulate and strengthen NSS & promote NCC activities on the campus. Most of the NSS activities are part and parcel of Green Initiatives and Criterion VII of NAAC.

परशोत्तम रूपाला
PARSHOTTAM RUPALA



मंत्री
मत्स्यपालन, पशुपालन एवं डेयरी
भारत सरकार
Minister
Fisheries, Animal Husbandry and Dairying
Government of India

D.O. No. 2730-MIN(FAH&D)/2023-24

21 DEC 2023



शुभकामना संदेश

यह जानकर खुशी हुई कि क्रांतिगुरु श्यामजी कृष्ण वर्मा कच्छ विश्वविद्यालय संचालित हमीर जी रतुं लोक साहित्य केंद्र द्वारा दिनांक 15/ 16 जनवरी को लोकसाहित्य और चारणी साहित्य के प्रचार-प्रसार और संवर्धन के लिए चारणी साहित्य के प्रतिष्ठित विद्वानों को आमंत्रित करके एक परिसंवाद का आयोजन किया गया है और इस अवसर पर मुझे यह जानकर विशेष प्रसन्नता हुई की जिन ज्ञान-पिपासु व्यक्तियों ने चारणी साहित्य के विभिन्न पहलुओं पर महाशोध निबंध लिखे हैं और पीएचडी की पदवी प्राप्त की है, उन्हें विधिवत् सम्मानित किया जाएगा।

इस अवसर पर केन्द्र द्वारा एक स्मरणिका भी प्रकाशित की जायेगी, जिसमें चारणी साहित्य के विशेषज्ञ विद्वानों द्वारा लिखे गये लेख प्रकाशित किये जायेंगे। सांप्रत युग में चारणी साहित्य, जो हमारी भव्य सांस्कृतिक विरासत है, उसका प्रचार-प्रसार एवं संवर्धन की गति और अधिक तेज हो सके एवं इस साहित्य के बारे में अधिक लोग जान सके एवं विशेषकर नई पीढ़ी को जानकारी प्राप्त करने का मौका मिलेगा, ऐसा मुझे विश्वास है।

चारणी साहित्य के प्रचार-प्रसार एवं संवर्धन हेतु आपके केन्द्र द्वारा की जा रहे इस प्रशंसनीय कृत्य में आप पूर्णतया सफल हो, ऐसी कामना करता हूँ।


(परशोत्तम रूपाला)

Delhi Office : Room No. 234, 'B' Wing, Krishi Bhawan, Dr. Rajendra Prasad Road, New Delhi-110 001
Tele.: +91-11-23380780, Fax: +91-11-23380783, E-mail: rupalaoffice@gmail.com
Gujarat State Camp Office : Plot No. 219, Sector-20, Gandhinagar-382 020, Tele.: 079-23260013
Website : <https://dahd.nic.in>

UNIVERSITY AWARD

12.4 Community Friendly campus

As a Academic community responsibility University tries to make the campus more vibrant and a healthy place for surrounding community

Facilities which University Campus includes;

- Eco-friendly green campus
- Walking track and ground for walkers and trainers
- Space for students preparing for physical training of competitive exams
- Drinking water facility
- Garden

12.5 Material Resources & Green Material

The University takes strict actions to minimize **construction waste** being sent to landfills, whenever any construction or renovation activities takes place on campus. University has avoided at least 20% of the waste generated (by either weight or volume) during construction from being sent to landfills. Provision is made to collect all construction debris generated on-site. This waste is segregated based on their utility. Means are examined of sending such waste to manufacturing units which would use them as raw materials. Typical construction debris include broken bricks, steel bars, broken tiles, glass, wood waste, paint cans, cement bags, packing materials, etc., even paper waste generated in office buildings and paper waste generated in form of exam supplementary is sent to recyclable industry through vendor.

The University encourages to use material with **Recycled content** i.e. **Material with recycled content** such as PPC cement, tiles with recycled content and high performance glazing whenever undertake addition alteration and special repairs to building. Use of materials which contain recycled content helps to reduce environmental impacts associated with the use of virgin materials. It is planned to use materials with recycled content such that the total recycled content constitutes at least 15% of the total cost of the materials used in the building(s)/ campus

Market survey is carried out for the materials with recycled content and locate such local suppliers. Materials with recycled content include Fly ash blocks, Tiles, Steel, Glass, Cement, False Ceiling, Aluminum and Composite Wood.

University has released building material during routine maintenance / addition and alterations. It is encouraged the use of salvaged building materials and products to reduce the demand for virgin materials thereby, minimizing the impacts associated with extraction and processing of virgin materials. It is ensured that at least 2.5% (or) 1% of the total building materials (by cost), used in the building(s)/ campus, are salvaged, refurbished and reused.

Opportunities are identified to incorporate salvaged materials into building design and provide opportunity for research potential material suppliers. Consider using salvaged materials such as flooring, paneling, doors, frames, furniture, brick, etc.

The University emphasis on use of building materials available locally thereby minimizing the associated environmental impacts resulting from transportation. This also helps to boost local economy and provide employment to local labours and personals. It is ensured that at least 50% of the total building materials (by cost), used in the building(s)/ campus, are manufactured within a distance of 400 km. Survey is conducted to identify building materials which are in the specified radius, in

early stages of project design. While selecting local materials, it is ensured that they perform better in terms of strength, maintenance and durability.

Last but not the least, University has made an attempt to minimize use of virgin wood thereby encouraging responsible forest management and maximize use of materials which are rapidly renewable. A survey is undertaken to identify all wood based applications in the building. Then the types of products needed (e.g., doors, windows, furniture, flooring etc.,) is determined. The possibility is explored of using FSC (Forest Stewardship Council) / Forest Department certified wood (and/or) rapidly renewable materials for all such wood based applications. Local dealers are identified who supply FSC/ local forest department certified wood/ rapidly renewable materials. Also while sourcing wood for various applications, the quality or grade of wood required is specified. Survey different types of rapidly renewable materials those are available in the market is done. Local suppliers are located so as to reduce additional costs and environmental impacts caused during transportation.

The University always prefers to use low VOC paints and varnishes with following limits, during painting works in University.

VOC Limits for Materials

Type of material	VOC Limit(g/L less water)
-------------------------	----------------------------------

Paints:

Non-flat (Glossy) paints	150
Flat (Mat) paints	50
Anti-corrosive/ anti-rust paints	250
Varnish	350

Adhesives:

Glazing adhesive	100
Tile adhesives	65
Wood adhesive	30
Wood flooring adhesive	100

13. Environment Consciousness & Institutional Distinctiveness

Environment has become a popular subject in the last three decades. Some of the problems faced by humankind directly or indirectly are due to ozone depletion, greenhouse effect, acid rain, global warming, air – water pollution and fossil fuel combustion. Chemicals and allied processes are the most important among these. Noticing the bad effects of chemicals and traditional energy sources on environment and human life, the University has been trying to find solutions for a better life. For this, creating awareness about environmental issues and conservation of the ecosystem have become increasingly important in the life skill education in the University.

The rationale behind the environmental education is based on three factors:

- a) If people are aware of the need and the ways of protecting the environment, they will act to preserve it,
- b) The student community should assume responsibility for educating others about the need for environmental protection and
- c) Environmental education can be effective as part of a university curriculum. Hence the University should prioritise it.

It is now mandatory for all the Educational Universities to conduct Green Auditing not only to discharge their Corporate Social Responsibility but also to retain their registration Certificate. However, in India, not many Green Auditors are available to green audit all the educational Institutions.

Hence, it is felt that it is the need of the hour to train at least 6 Green Auditors a year through a Diploma Course on Green Auditing / Green Buildings.

The duration of the course shall be 6 months and in one course 30 students of the Institution shall be enrolled and

trained in all aspects of environment protection which includes biodiversity promotions, carbon reduction measures, energy auditing, water auditing and individual responsibility to reduce carbon Footprint.

The Diploma course will be affiliated to the MSME of the Govt. of India and the students who completed the course shall get government certificates that will help them to be professional Green Auditors.

14. Suggestions & Recommendations

There exists vast scope to improve upon the above said for the University with respect to Green campus, Green Initiatives, and Green & Environment Audit of the campus.

- 1. It is recommended to organize Seminars, Conferences and Workshops in the University to make all stakeholders of University aware of the Criterion VII of NAAC regarding Institutional Values & Best Practices, focussing on Green Buildings, Water Audit, Energy Audit, Energy & Water Efficiency, Post Occupancy Waste Management System, Rain Water Harvesting, Indoor Environmental Quality, Green Energy, Carbon Footprint & Handprint, Zero Emission, Net Zero Campus, Water Positive Campus and other Environmental related topics to create awareness amongst the students, staff. This will help to successfully implement Green Policy on campus. University Administration is also advised to take actions to pass on this message to Students Elected Wing and campaign for the same during the functions and programmes.*
- 2. The entire exercise of Green & Environment Audit is not only for Academic purpose but it has to be implemented in Letter and Spirit.*
- 3. It is also recommended to place permanent signages in each class rooms and wash rooms requesting to put off lights, fans and exhaust fans when not in use. Signage to Save energy, Save Water, Waste collection, No Smoking, Anti-Ragging, No Tobacco, etc. has also to be placed in more numbers. University Management must place more signages to make the policy more effective and convey the message to each and every student at each and every corner of the campus.*

- 4. There can be one master switch in all class rooms connecting all lights and fans so as to have proper control over the operation of all lighting fixtures and fans.*
- 5. Motion sensors can be installed in wash room areas and lobbies to prevent wastage of energy.*
- 6. University also has to prepare post-occupancy survey to verify occupant comfort (lighting levels, temperature, relative humidity, noise levels, etc.). Report on building performance of the equipment & systems listed. The report for each of the equipment & systems covers the following:*
 - Equipment specifications*
 - Test results with specific comments.*
 - Key monitoring aspects to sustain performance*
 - Estimated energy & water consumption*
 - Scope for performance enhancing in future, and savings thereof*
- 7. It is suggested to arrange a talk on **Green Transportation** wherein students and staff are educated for adopting Green Transportation and also save money and preserve their health. The figures clearly show that the bicycles are hardly used by students and staff. The University need to encourage and motivate students and staff to use bicycles or walk down if the distance is small.*
- 8. Students and staff are to be further informed and motivated to use battery operated two wheelers, which will reduce CO₂ emission and also save fossil fuel. It is further recommended to provide battery charging facility i.e electric plug points in parking place.*
- 9. University to provide preferred parking for two and 4 wheelers if they enter in pooling or using E-vehicle.*

10. The University has to install water efficient plumbing fixtures to enhance water use efficiency and minimise the use of potable water on campus. The plumbing fixtures must meet the baseline criteria, individually or in aggregate. The total annual water consumption of the campus can be controlled and not to exceed the total base case water consumption computed. The base case is considered as per NBC/IGBC/GRIHA

Baseline Flow Rates / Capacity as per Uniform Plumbing Code of India (UPCI)

Fixture Type	Maximum Flow Rate / Capacity	Duration	Daily Uses per Person/ Day
Water Closets	6 LPF (High flush)	1 Flush	1
	3 LPF (Low flush)	1 Flush	1
Health Faucet/ Bidet, Hand-held spray*	6 LPM	15 Seconds	1
Faucet/ taps*	6 LPM	15 Seconds	8
Kitchen Sink*	6 LPM	15 Seconds	6
Urinal*	4 LPF	1 flush	2
Showerhead* / Hand-held Spray*	10 LPM	8 Minutes	1

Source: Uniform Plumbing Code – India, 2016

* At a design pressure of 4 bar

11. It is suggested to undertake landscape design to ensure minimum water consumption. Campus has a large open space but not properly developed. A detailed landscape plan has to be prepared with Green mapping. Landscape area to be planted with drought tolerant/native/adaptive species. The landscape here refers to soft landscaping, which includes only pervious vegetation and landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.

12. When University is undergoing Green & Environment Audit then the management must install proper water efficient irrigation facility in form of sprinklers, shut off valves, moisture sensors, drip irrigation, root zone system

etc. Use of organic manure will lead to mucus and increase in void ratio with increase in water carrying capacity of soil

- 13. The University may undertake Green Mapping so that University is able to know the exact quantum of Green treasure within in form of trees, bushes, creepers and landscape. University can also plan for future planting of saplings so that the open space can be properly utilized.*
- 14. It is further suggested to install water meter to improve water performance of the building, and thereby save potable water. Presently there is no water meter installed to calculate the consumption of water for irrigation, flushing, potable and other usages. Hence it is proposed to install water meter to know the actual consumption of water in a building. It is proposed to ensure continuous monitoring of water consumption, both on supply and demand side, to identify improvement opportunities in potable water efficiency.*
- 15. The TDS in ground water can be improved by careful Ground water recharge strategies. Let this entire system be a Case Study not only for university but this region. Let students and teachers from various colleges/schools and public at large visit this rain water recharge system and implement at their places. We need to market our expertise.*
- 16. University is advised to undertake detailed Water audit exercise. National water policy has also insisted to undertake water audit, which is the first step towards water efficiency and water conservation so that concrete and perfect measures can be taken for water conservation and efficiency. Even Reduce, Recharge and Reuse strategies in field of water can be further strengthen on campus and better implemented and the campus can move towards zero discharge campus from storm water point of view.*

- 17. University to undertake detailed Energy Audit so that perfect measures can be taken for energy conservation and efficiency. University to implement ECBC and ASHRAE norms strictly and even install movement sensors and daylighting sensors for better energy efficiency. Even University may undertake exercise daylighting simulation for designing weather sheds, projections, pargolas etc.*
- 18. University must improve Post occupancy waste management system. Dustbins to be placed in building corridors to collect various kind of waste such as paper water, glass waste, organic waste etc. Then mark a place on campus to collect all this waste separately and then send it to recyclable industry.*
- 19. University may Retrofit existing building into Green Building. It will be desirable to get Green Building Certification from IGBC/GRIHA or USGBC under Existing Green Building Certification. The certification process will make sure that all the buildings under takes all eoc-friendly measures strictly as per the guidelines of Green Buildings and let the building become model where others may visit the building to study the measures adopted to make it a Green/ Energy Efficient Building*
- 20. The University also needs to have separate preferred parking space near ramp at main entrance for Divyangs.*
- 21. Environment Education may be imparted to all the students thorough 1-hr life-skill classes once a week. This will create wide-level environment consciousness among the student community. They will be sensitized to encourage pillion riding with their peers or use public transport instead of two wheelers. Moreover, they will also motivate their parents, colleagues and relatives for water and energy efficiency approach.*

22. University may Prepare questionnaire related to the environment and then place it before the staff and students to assess their understanding of environment – related issues.

The questions can be focused on four concerns:

- ***Whether they consider themselves eco-conscious?***
- ***Do they consider the University to be eco-friendly?***
- ***What do they think are the top priorities that should be tackled to improve the green campus status of the University?***
- ***Whether the students and teachers who own vehicles are aware of the quantity of CO2 emission by their vehicles?***
- ***What do they think to save water and electricity on campus?***

23. Students who own two wheelers / four wheelers are to be sensitized of the carbon emission by their vehicles and educate them on this regard. They are also to be motivated to share their vehicles on alternative days with their peers. For example, 50 % of the students who own two wheelers are to be advised to share their ride with their fellow students/neighbours. Thus, the carbon emission can be reduced by 50 % in the coming years. Students to be use bicycle or walk down if the house is nearby.

24. Finally, University may form a Cell to facilitate Other Colleges / Universities for Green & Environment Audit. This would help University to know strength and innovative ideas of other university and would also make it popular for extending this helping hand.

25. The University has to involve students more in NSS & NCC activities and most of the activities of NSS are part and parcel of of Green Initiatives and Eco-friendly development

ABOUT UNIVERSITY VISION & MISSION

Vision-

To be a leading centre of excellence in education, research and innovation by offering accessible higher education opportunities in several discipline of knowledge in the Kachchh region and beyond that empower students to be responsible citizens who can realise their full potential, make positive contribution to society and uphold the Indian value system

Mission-

- To offer cutting-edge courses that explore local resources and opportunities and encourage students for innovation and entrepreneurship.
- To serve as a catalyst for positive change by addressing complex challenges faced by society through collaborative and interdisciplinary research.
- To inspire and empower students through transformative education, innovative research, and impactful community engagement, preparing them to become global citizens and leaders of tomorrow.
- To promote a dynamic learning environment that nurtures critical thinking, creativity, intellectual curiosity, academic excellence, and cultural understanding among the students and faculty
- To assimilate and transmit Indian values for character-building through moral and humanitarian education.

GREEN & ENVIRONMNET



AUDIT CERTIFCATE



EARTH



WATER



AIR



LIGHT



SPACE



TRANSPORT



HYGIENE



EDUCATION



SAFETY



INNOVATION

THE **ENVIRONMENT, GREEN, ENERGY & WATER AUDIT** OF

KRANTIGURU SHYAMJI KRISHNA VERMA

KACHCHH UNIVERSITY , GUJARAT

was successfully undertaken as per the standards specified by

NBC,IGBC, GRIHA & ECBC

Universal Consultancy, Vadodara

GUJ\VDD\17959 dated 17-10-2007

IGBC-AP, GRIHA-PATRON, IGBC-FELLOW

MIE, Member-INTACH, Member-IGBC,

20th of May, 2024



PATRON--GRIHA



IGBC--FELLOW



MEMBER--ASHRAE



MEMBER—INTACH



GEM-CP

N. K. Ojha,
Former I/c Registrar & University Engineer,
The M. S. University of Baroda

LOKPAL—MGNREGA—Rural Development, Government of Gujarat
Arbitrator, National High Speed Rail Corporation Limited, Vadodara
Arbitrator, INFLIBNET Centre, Gandhinagar, Gujarat

Inquiry Officer, Deendayal Port Trust, Gandhidham, Gujarat
Inquiry Officer, Gujarat State Police Housing Corporation Limited
Technical Expert---Centre for Entrepreneurship Development, GoG
Technical Advisor to State Universities, SGGU, BNMU, BAOU, MKB

Green Building Consultant, GDRPL, Vadodara
Bank of Baroda, Union Bank of India, IOCL, HPCL, ADAMA, Pidilite,
Nippon, Thal Sena Bhawan, Gati Shakti University, MES, etc.
Chartered Engineer & Civil Auditor,

Project Management Consultant & TPI,
IGBC-AP, IGBC-Fellow, GRIHA-Patron

Date: 20-05-24

WHOMSOEVER IT MAY CONCERN

This is to Certify that ***Krantiguru Shyamji Krishna Verma Kachchh University*** have undertaken the process of Environment, Green, Energy & Water Audit with Action Plan & have also undertaken Green Initiatives in the field of Energy & Water Conservation with proactive action in Post Occupancy Waste Management.

The University has further taken steps for mobilizing Green Awareness programme on the Campus.

I wish University Good Luck in their future endeavor in the field of Sustainability and Appreciate the Green Initiatives taken up.


N. K. Ojha



PATRON--GRIHA



IGBC--FELLOW



MEMBER--ASHRAE



MEMBER--INTACH



GEM-CP

N. K. Ojha,
 Former I/c Registrar & University Engineer,
 The M. S. University of Baroda
 Technical Advisor to Govt. Institutions
 B.E. (Civil), M.I.E.,
 Chartered Engineer, Civil Auditor,
 Project Management Consultant & TPI,
 Green Building Consultant,
 IGBC-AP, GRIHA-Patron

Invoice No. 0021/2024-2025

Date---27-10-2024

To,
 The Registrar,
 Krantiguru Shyamji Krishna Verma Kachchh University,
 BHUJ, Gujarat

I N V O I C E---First & Final

DESCRIPTION	AMOUNT (Rs.)
--------------------	---------------------

For Environment, Green, Water & Energy Audit Report Visit Site, collecting data, analysing data, And Report drafting and finalizing covering all points of Criterion VII of NAAC i.e Institutional Values & Best Practices	
---	--

Received till date	Nil
--------------------	-----

Balance	40,000
----------------	---------------

(RUPEES Firty Thousand Only)

PAN--AABPO1656R
Bank Account Details
A/C No. 02010100012210
Bank of Baroda

RTGS/NEFT IFSC CODE---
BARBOMSUNIV
University Campus Branch
Baroda--390006