



# GANESAR COLLEGE OF ARTS AND SCIENCE

(Accredited with 'B' grade by NAAC)

MELAISIVAPURI - 622 403, PUDUKKOTTAI, TAMILNADU

Phone: 04333 - 247218, 247603



## GREEN AUDIT REPORT





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# GREEN & ENVIRONMENT AUDIT REPORT

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GANESAR COLLEGE OF ARTS & SCIENCE  
MELASIVAPURI, PUDUKOTTAI DIST-622403



GANESAR COLLEGE OF ARTS AND SCIENCE

Affiliated to Bharathidasan University  
Nationally Accredited with 'B' Grade by NAAC



**FEBRUARY 2023**  
**IGNITE ENGINEERING**  
CHENNAI

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## Executive Summary

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The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will pave way for sustainable development.

GCAS believes that there is an urgent need to address these fundamental environmental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution.

It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, and Alternative Energy. With this in mind, the specific objectives of the audit was to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on student health and learning college operational costs and the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.

## Introduction

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Green audit was initiated with the beginning of 1970s with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. It is known as the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity.

It is the duty of organizations to carry out the Green Audits of their ongoing processes for various reasons such as; to make sure whether they are performing in accordance with relevant rules and regulations, to improve the procedures and ability of materials, to analyze the potential duties and to determine a way which can lower the cost and add to the revenue.

## Green & Environment Audit Report - 2023 GANESAR COLLEGE OF ARTS & SCIENCE-MELASIVAPURI

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, colleges, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly institute.

### About the College

**GANESAR COLLEGE OF ARTS & SCIENCE** is an Arts & Science college affiliated to Bharathidasan University with ISO 9001 – 2015 Certification. It has been recognized as a premier institution of higher learning for job-oriented courses.



The campus is spread over an area of 3 acres of land with Huge built up area .The college offers 9 Under Graduate Courses and 4 Post Graduate and Research courses in Arts & science Stream There are 873 students and 65 teaching faculty in the college which is promising to grow rapidly.

The College offers job-oriented courses, extra-curricular activities and technologically advanced facilities accessible to the faculty, the students and the support staff. Here, each individual is encouraged to step beyond the confines of academic and administrative disciplines to explore and intervene in the larger interests of the GCAR community that thrives on participation and the desire to venture into newer vistas.

## Objectives of the Study

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The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out Green Audit are:

- To introduce and aware students to real concerns of environment and its Sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use of the campus.
- To establish a baseline data to assess future sustainability by avoiding the Interruptions in environment that are more difficult to handle and their corrections requiring high cost.
- To bring out a status report on environmental compliance.

## Benefits of green audit

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- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.
- Impart environmental education through systematic environmental Management approach and Improving environmental standards
- To create a green campus.
- To enable waste management through reduction of waste generation, solid-waste and water recycling.

## Methodology

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In order to perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarize the present status of environment management in the campus:

- Water management
- Energy Conservation
- Waste management
- E-waste management
- Green area management
- Environment Monitoring

## Observations and Recommendations

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### Water Use

The study observed that the main source of water for the institute is received from two bore wells. Water is used for drinking purpose, toilets and gardening. The waste water from the RO water purifier is used for gardening purpose. During the survey, no loss of water is observed, neither by any leakages, or by over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 25,000 L/day, which include 20,000 L/day for domestic, 3,000 L/day for gardening purposes and 2,000 L/day for drinking purpose.

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*Recharge Bore well inside the campus*





## **Rain Water Harvesting**

Rain water harvesting units are also functional for recharging ground water level. The rain water collected from all floors of the building and Harvested in the recharge well available inside the campus .



*Rain Water Harvesting Pits inside the campus*



### **Recommendations**

- There is a need for monitoring and controlling overflow and periodically supervision drills should be arranged.
- Minimize wastage of water and use of electricity during the reverse osmosis process and ensure that the equipment used are regularly serviced and in good condition.
- The cleaning products used by staff should have a minimal detrimental impact on the environment. They should be biodegradable and non-toxic.
- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. they are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.
- Gardens should be watered by using drip/sprinkler irrigation system to minimize water use.

## **Waste Management**

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

### **Observations**

#### **Liquid waste management**

They have a **Main RO plant** is installed in the college of 1000Ltr/hr and supplied to all the blocks in the campus which is easily access to all the students & staffs to provide water for drinking and Cooking Purpose in Mess & Canteen.



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*RO Water Plant inside the Campus*



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*Purified Water in all the Blocks*

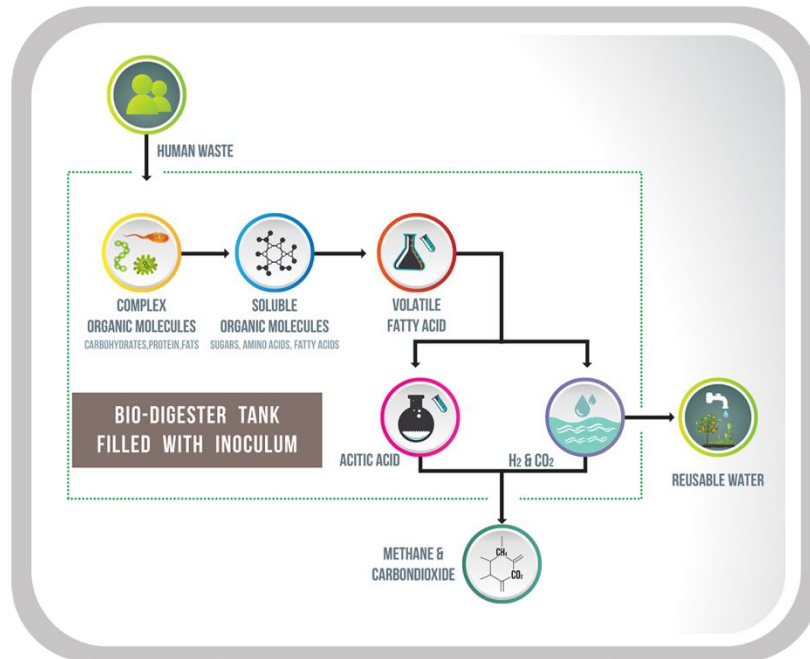


## **Bio Treatment Plant**

Water is the basic necessity of life used for many purposes. So, recycling water is necessary. Considering this in our mind, GCAR have established an Bio Digester plant inside the campus. The treated water is utilized properly for watering the plants throughout the campus.

Bio Septic Tanks made of RCC is equipped with inlet pipe for human waste. The inoculums produced from our own inoculum plant for bio septic tanks that are introduced into the bio septic tank helps convert the solid waste into liquid effluent which can be drained off to any surface and used for irrigation purposes.

An inlet pipe for the waste connects the toilet to the bio septic tank. The outlet pipe for carrying the effluent is placed on the other side. The anaerobic bacterial inoculum is then injected into the bio septic tank. Sewage enters the bio septic tank through the inlet pipe; it then passes over the consortium of anaerobic bacteria which break it down into gas and effluent. The treated effluent comes out through the outlet pipe and can be used as such for gardening purposes or can be treated further by passing it over the reed bed system.



*Bio water Treatment Process*

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*Bio water Treatment Process inside the campus*



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#### **Solid waste management**

Waste generated from tree droppings and lawn management is major solid waste generated in the campus. Separate dustbins are provided for Bio-degradable and Plastic waste in order to segregate them at the source itself. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Important and confidential reports/ papers are sent for pulping and recycling after completion of their preservation period.

Chemical waste generated in laboratories that are potentially hazardous are segregated. Very less plastic waste (0.1Kg/day) is generated by some departments, office, garden etc Metal waste and wooden waste is stored and sent to authorized scrap agents for further processing. Glass bottles are reused in the laboratories.

The college had Placed separate bins to collect biodegradable and non-biodegradable waste generated in the campus.



*Separate Bins for Degradable & Non Bio Degradable*



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*Plastic Free Campus*

**Recommendations**

- The amount of waste generated from classrooms and staff rooms can be minimized.
- Full use of all recycling facilities provided by City Municipality and private suppliers can be utilized for waste disposal.
- Sufficient, accessible and well-publicized collection points can be made available for recyclable waste, with responsibility for recycling clearly allocated.
- If Biomedical Waste Accumulated Ensure to Proper Government Authorized Vendor to collect it.
- Solid Waste Management awareness Training Recommended for all the works one who are Involved in Gardening & Sweeping Work.

## **E-waste Management**

E-waste is a consumer and business electronic equipment that is near or at the end of its useful life. This waste makes up about 5% of all municipal solid waste worldwide. It is hazardous than other waste because electronic components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

### **Observations**

E-waste generated in the campus is of minimal quantity. It is being effectively managed, keeping in mind the environmental hazards that may arise if not disposed properly.

The cartridges of laser printers are refilled outside the college campus. Administration Awareness programmes are being conducted regarding E-waste Management in various departments. The E- wastes and defective items from computer laboratories are being stored properly.

The dismantled hardware of personal computers are used in PC trouble shooting lab. This is put to use to conduct practical courses for Students and The dismantled electronic spare parts are immediately sold for reuse. The minimal amount of e-waste that is generated after reusing is sent to recycler at specific intervals.

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*E-Waste is properly collected in the campus*



### **Recommendations**

- Use reusable resources and containers and avoid unnecessary packaging wherever possible.
- The management should take an initiative to purchase recycled resources when they are available.
- Recycle or safely dispose of white goods, computers and electrical appliances.
- The Management engage proper Vendor to dispose the E Waste frequently.

### **Green Area Management**

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy enacted, enforced and reviewed using various environmental awareness programmes.

### **Observations**

Campus is located in the vicinity of many trees (species) to maintain the biodiversity. Various tree plantation programs are being organized at college campus and surrounding villages through NSS (National Service Scheme) unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes various type of indigenous species of ornamental and medicinal wild plant species.

The college cultivates vegetables for its own use through organic farming initiatives.

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*Green Area Management Inside The campus*



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*Green Belt Across The campus*



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*Student & Faculty Involvement in Tree Plantation*



### **Sanitary Napkin Incinerator**

To educate and create awareness of use of Sanitary Napkins and provide easy access to Sanitary Napkins by installation Simple Vending Machines in our girls toilet so that Girls/Women get habituated to use this Sanitary Napkins for their better health care. Secondly, to solve the problem of sanitary napkin disposal by installing incinerators which shall reduce spread of infection due to unhygienic disposal of sanitary napkins, reduce environmental pollution due to non-biodegradable sanitary napkins and reduce clogging of public drainage system due to spongy nature of napkins.



***Sanitary Napkin Incinerator & Vending Machine inside The Campus***



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**Recommendations**

- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records. Assign scientific names to the trees.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy.
- The Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- Indoor plantation to inculcate interest in students, Bonsai can be planted in corridor to bond a relation with nature.
- Green library should be established.

### Sanitation and Hygiene

Unsafe operation of educational institution can lead to transmission of diseases. It can cause negative impacts to students, their families, institute reputation and overall development. Therefore, good health and sanitation practices are very important especially considering the ongoing Covid'19 pandemic.

The provision of safe water and sanitation facilities is a first step towards a healthy physical learning environment. However, the mere provision of facilities does not make them sustainable or ensure the desired impact. Hygiene practices are employed as preventative measures to reduce the incidence and spreading of disease. Hygiene education aims to promote those practices that will help prevent water and sanitation-related diseases as well as inculcating healthy behaviours in the future generation of adults. Therefore, the combination of facilities, correct behavioural practices and education are meant to have a positive impact on the health and hygiene conditions of the community as a whole, both now and in the future.

**1. Drinking water:** Clean water as per drinking water standards have been ensured to students through Reverse Osmosis plant. RO plants of different capacity have been installed.

**2. Water Supply:** Adequate and clean water supply through Public Water Supply and borewell system has been ensured.

**3. Sanitation:** Adequate number of urinals/toilets have been operational in main Campus, Hostel, and Other areas. No open and flowing latrines were noticed. Sanitation facilities are found to be proper and adequate.

**4. Waste Management:** Waste management bins are placed at each block to store and dispose through municipality. During audit, no unattended waste dumping was noticed.

**5. Awareness:** Hygiene awareness posters especially related to Covid'19 is displayed at various locations in the campus. Overall, campus follows very good sanitation practices.

## Green Initiatives and Best Practices

The list of few important green initiatives and good environmental practices adopted by the campus is given below.

- Rainwater harvesting pits are constructed at appropriate locations to improve local ground water table.
- Installed solar Plant to meet partial power requirement of the Campus
- Replaced 60% of CFL lights with LED lights as part of energy conservation measures. Also, some of the old fans were replaced with energy efficient super fans.
- Engagement of authorized paper recycling vendor to manage bulk paper waste generated.
- Establishment of Organic Cultivation
- Celebration Of World Environment Day and creating Environment Awareness to all Students & Staffs
- Restricted movement of vehicles inside the campus. Parking space inside campus is provided for vehicles, however, no movement of vehicles inside campus is encouraged.
- Awareness posters on resource conservation, good sanitation and hygiene drive.
- Strictly follow the Plastic Free zone inside the campus is Encouraged.

# Environmental Monitoring

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As part of green audit of campus, the Green Audit Assessment Team has carried out the environmental monitoring of campus. This includes Illumination, Noise level, ventilation and indoor Air quality of the class rooms. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Noise level in the campus is well below the limit.

The following surveys were conducted:

1. Ambient air quality by NABL approved air sampler
2. Lux monitoring
3. Noise monitoring
4. Co2 Monitoring

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#### **Ambient Air Quality Monitoring**

Ambient air quality monitoring can help in providing a strategic solution towards air purification and help lead a safer life. Also, air quality monitoring in the college campus not only develops trust among the parents but ensures that the administration cares about their Students and Staff.

#### **Lux & Noise Monitoring**

Illumination is one of the most important environmental factors in the classroom. Many Doctors have discovered that lighting settings have significant impact on students' performance. So Lux monitoring can help in providing a Comfort Vision Environment to Students.

When assessing noise exposure in campus environments, it can be difficult to determine whether the level of sound has reached a point where it interferes with student learning and staff productivity, or worse, becomes a threat to their health and well-being.

#### **CO2 Monitoring**

CO2 levels can provide a direct indication of the CFM per person ventilation rate in College classrooms and can provide an ongoing indication if code required ventilation rates are being maintained. It is important to Maintain that CO2 levels a contaminant or pollutant at the levels normally measured in buildings (400 to 2000 ppm). Measurement Based On ASHRAE Standards.

## Conclusion

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Green audit is a systematic approach to understand the existing environmental practices and identify areas of improvement for attaining an eco-friendly approach to the sustainable development of the college. The report is prepared based on the site visit observations and information provided by the campus.

Overall, GCAR has taken many environmentally friendly approaches and campaigns in the area of energy, water, solid waste, sanitation and green cover, which is highly commendable.

.The environmental awareness initiatives taken by the management are substantial. The installation of water recycling plants, paperless work system and Solar practices are remarkable. Besides, environmental awareness programmes initiated by the administration prove the campus is going green. Few recommendations are added for waste management and waste reduction using alternate eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus aid in a sustainable environment and community development.

## Acknowledgement

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We are grateful to the management and committee members of Ganesar College Of arts & Science to award this prestigious project on green auditing. Further we sincerely thank the college staff for providing us the necessary facilities and co-operation during the audit. This ample co-operation helped us a lot in making this audit possible and successful.

**FOR IGNITE ENGINEERING**



**ER.P.VIVEK M.E(Ph.D)**  
**LEAD GREEN ASSOCIATE**  
**CHARTERED ENGINEER**

**FOR IGNITE ENGINEERING**



**ER.S.KARTHIGA M.E(Ph.D)**  
**LEAD AUDITOR-ENVIRONMENT**



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## ILLUMINATION MONITORING

<b>Report No</b>	<b>IES-NO-IN-23-261-2023</b>	<b>Report Date:</b>	<b>11.02.2023</b>
Customer Name & Address <b>M/s. Ganesar College Of arts &amp; Science</b> Melasivapuri, Pudukkottai Dt., Tamilnadu – India, Pincode: 622403.		<b>Sample of Reference No:</b>	IES-NO-IN-22-096-2023
		<b>Sample Description:</b>	Light
		<b>Monitoring By:</b>	Laboratory
		<b>Monitoring Date:</b>	08.02.2023
		<b>Data Received On:</b>	08.02.2023
		<b>Sampling Method:</b>	IS 3646 (part1):1992 (Reaffirmed 2003)
		<b>Monitoring unit:</b>	Lux

S.no	Name of the Location	Monitoring Distance in m	Monitoring Time	Day Time (6.00 a.m -10.00 p.m)		
				Minimum	Maximum	L Equivalent
1.	Admin Block	0.9	11 AM –12PM	333	427	409
2.	Library	0.9	11 AM –12PM	224	236	238
3.	Class Room-01	0.9	11 AM –12PM	302	367	318
4.	Class Room-02	0.9	11 AM –12PM	401	454	213
5.	Class Room-03	0.9	11 AM –12PM	416	447	431
Permissible Limit For Light as Per The Factories Rules, 1950				Maximum 65		

<-----End of Report----->

### NOTES:

The above Location Light levels are fulfill the necessities of **Factories Rules 1950 standard.**

Report Confirmed by

*D. Dusi*



FOR IGNITE ENVIRONMENTAL SERVICES

*S. Kaveer*

Authorized Signatory





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## NOISE MONITORING

<b>Report No</b>	<b>EL-NO-NE-22-262-2023</b>	<b>Report Date:</b>	<b>11.02.2023</b>
Customer Name & Address <b>M/s. Ganesar College Of arts &amp; Science</b> <b>Melasivapuri,</b> <b>Pudukkottai Dt.,</b> <b>Tamilnadu – India, Pincode: 622403</b>		<b>Sample of Reference No:</b>	IES-NO-IN-22-088-2022
		<b>Sample Description:</b>	Noise
		<b>Monitoring By:</b>	Laboratory
		<b>Monitoring Date:</b>	07.02.2023
		<b>Data received On:</b>	07.02.2023
		<b>Sampling Method:</b>	IS:9989- 1981 (Reaffirmed 2001)
		<b>Monitoring unit:</b>	Db (A)

S.no	Name of the Location	Monitoring Distance in m	Monitoring Time	Day Time (6.00 a.m -10.00 p.m)		
				Minimum	Maximum	L Equivalent
1.	Admin Block	Site	11 AM –12PM	54.9	59.7	57.3
2.	Library	Site	11 AM –12PM	58.9	65.2	61.1
3.	Canteen	Site	11 AM –12PM	56.0	55.0	55.6
4.	Class Room-1	Site	11 AM –12PM	51.2	61.5	60.0
5.	Class Room-11	Site	11 AM –12PM	58.1	62.3	56.1
Permissible Limit For Noise as Per The Factories Rules 1950				Maximum 90.0		

<-----End of Report----->

**NOTES:**

The sound levels tested in the above locations are within the prescribed limits of Factories rules 1950 Standard Limits

Report Confirmed by

*D. Dis*



FOR IGNITE ENVIRONMENTAL SERVICES

*S. Kaveer*  
Authorized Signatory



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## AMBIENT AIR MONITORING

Report No	IES-NO-AR-72-184-2023	Report Date:	11.02.2023
Customer Name & Address  M/S . Ganesar College Of arts & Science Melasivapuri, Pudukkottai Dt., Tamilnadu – India, Pincode: 622403	Sample Reference No:	IES-NO-AR-72-104-2023	
	Sample Description:	Ambient Air	
	Sample Drawn by:	Laboratory	
	Sample Collected Date:	07.02.2023	
	Qty of sample Received:	Filter Paper(2nos) & Approx 25ml Solution(4nos)	
	Sample Received On:	07.02.2023	
	Test Commenced On:	07.02.2023	
	Test Completed On:	11.02.2023	
	Sampling Method:	IES-SOP-ARS-01 to 11	
	Sample Mark:	Near to Main block	

S.No	Name of the Test	Test Method	Units	Results	Max. Annual Average Limits Of NAAQs
1.	Ammonia (as NH <sub>3</sub> )	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<5.0	100
2.	Arsenic (as As)	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<0.1	6.0
3.	Benzene (as C <sub>6</sub> H <sub>6</sub> )	IS 5182 (Part 11): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	<0.5	5.0
4.	Benza (α) Pyrene(as C <sub>20</sub> H <sub>12</sub> )	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<0.5	1.0
5.	Carbon Monoxide (as CO)	Instruments Manual Based SOP No.EL-SOP-ARS-17	µg/m <sup>3</sup>	<1.2	2.0
6.	Lead (as Pb)	IS 5182 (Part 22): 2004 (Reaffirmed 2014) Clause No.5	µg/m <sup>3</sup>	<0.5	0.5
7.	Nickel (as Nil)	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<1.0	20
8.	Oxidants (as Ozone O <sub>3</sub> )	IS 5182 (Part IX)- 19747 (Reaffirmed 2014)	µg/m <sup>3</sup>	<10.0	100
9.	Oxidants of Nitrogen (as Ozone NO <sub>2</sub> )	IS 5182 (Part 6): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	9.1	40
10.	Particulate Matter (as PM <sub>10</sub> )	IS 5182 (Part 23): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	10.0	60
11.	Particulate Matter (as PM <sub>2.5</sub> )	EPA 40 CFR Part 50- Appendix L	µg/m <sup>3</sup>	5.6	40
12.	Sulphur Dioxide (as SO <sub>2</sub> )	IS 5182 (Part 2): 2001 (Reaffirmed 2017)	µg/m <sup>3</sup>	5.9	50

<-----END OF REPORT----->

### NOTES:

The Concentrations of the parameters tested in the above Location are within the prescribed annual average limits of NAAQs tolerance limits.

Report Confirmed by

*D. Das*



FOR IGNITE ENVIRONMENTAL SERVICES

*S. Anand*

Authorized Signatory



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## AMBIENT AIR MONITORING

Report No	IES-NO-AR-72-185-2023	Report Date:	11.02.2023
Customer Name & Address	M/s Ganesar College Of arts & Science Melasivapuri, Pudukkottai Dt., Tamilnadu – India, Pincode: 622403	Sample Reference No:	IES-NO-AR-72-105-2023
		Sample Description:	Ambient Air
		Sample Drawn by:	Laboratory
		Sample Collected Date:	07.02.2023
		Qty of sample Received:	Filter Paper(2nos) & Approx 25ml Solution(4nos)
		Sample Received On:	07.02.2023
		Test Commenced On:	08.02.2023
		Test Completed On:	11.02.2023
		Sampling Method:	IES-SOP-ARS-01 to 11
		Sample Mark:	Near to library

S.No	Name of the Test	Test Method	Units	Results	Max. Annual Average Limits Of NAAQs
1.	Ammonia (as NH <sub>3</sub> )	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<5.0	100
2.	Arsenic (as As)	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<0.1	6.0
3.	Benzene (as C <sub>6</sub> H <sub>6</sub> )	IS 5182 (Part 11): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	<0.5	5.0
4.	Benza (α) Pyrene(as C <sub>20</sub> H <sub>12</sub> )	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<0.5	1.0
5.	Carbon Monoxide (as CO)	Instruments Manual Based SOP No.EL-SOP-ARS-17	µg/m <sup>3</sup>	<1.2	2.0
6.	Lead (as Pb)	IS 5182 (Part 22): 2004 (Reaffirmed 2014) Clause No.5	µg/m <sup>3</sup>	<0.5	0.5
7.	Nickel (as Nil)	CPCB Guidelines, Volume I, NAAQMS/36/2012-13	µg/m <sup>3</sup>	<1.0	20
8.	Oxidants (as Ozone O <sub>3</sub> )	IS 5182 (Part IX)- 19747 (Reaffirmed 2014)	µg/m <sup>3</sup>	<10.0	100
9.	Oxidants of Nitrogen (as Ozone NO <sub>2</sub> )	IS 5182 (Part 6): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	9.0	40
10.	Particulate Matter (as PM <sub>10</sub> )	IS 5182 (Part 23): 2006 (Reaffirmed 2017)	µg/m <sup>3</sup>	10.6	60
11.	Particulate Matter (as PM <sub>2.5</sub> )	EPA 40 CFR Part 50- Appendix L	µg/m <sup>3</sup>	5.3	40
12.	Sulphur Dioxide (as SO <sub>2</sub> )	IS 5182 (Part 2): 2001 (Reaffirmed 2017)	µg/m <sup>3</sup>	6.0	50

←-----END OF REPORT----->

### NOTES:

The Concentrations of the parameters tested in the above Location are within the prescribed annual average limits of NAAQs tolerance limits.

Report Confirmed by

*S. Anil*



FOR IGNITE ENVIRONMENTAL SERVICES

*S. Karan*

Authorized Signatory



**IGNITE**  
Engineering  
- THE SPARK OF SOLUTIONS -

# IGNITE ENVIRONMENTAL SERVICES

An ISO 9001:2015 Certified Organization

Environmental Testing & Analysis, Calibration of Instruments

No.38/2, F1 Ranga Flats, Bharathiyar Street, Near Indian Bank,  
Hasthinapuram Road, Chrompet, Chennai - 44.

Regional Office : Pondicherry, Coimbatore & Andra Pradesh

Contact : 8778740104, 9384381615 | Email : igniteengg@gmail.com



9001:2015



## TEST REPORT

Sample Ref No: IES/AS/177/2023		Date of Sampling: 07.02.2023		
Issued To:		Report Date/Report No: 11.02.2023		
<b>M/S. Ganesar College Of arts &amp; Science</b> <b>Melasivapuri,</b> <b>Pudukkottai Dt.,</b> <b>Tamilnadu – India, Pincode: 622403.</b>				
Page 1 of 1				
Group : Atmospheric Pollution		Sample Drawn By/Date : IES/07.02.2023		
Discipline : Chemical Testing		Received On : 07.02.2023		
Sample Description : Indoor Air Quality		Analysis Commenced On : 08.02.2023		
Sampling Method : IS 5182, NIOSH & SOP		Analysis Completed On : 11.02.2023		
Sl. No	Sampling Location	UNIT	RESULT Carbon-di-oxide (CO <sub>2</sub> )	ASHRAE LIMITS
1	Central Library	ppm	254	1000
2	Office	ppm	264	
3	Principal Room	ppm	232	
4	Canteen	ppm	220	
5	Computer Lab	ppm	241	
<b>ASHRAE- American Society of Heating Refrigerating and Air-Conditioning Engineers,</b>				

-----End of Report-----



Authorized Signatory

- Note
1. Test result shown in this test report relate only to the items tested
  2. This test Report shall not be reproduce anywhere except in full and in same format without the approval of the Laboratory



# *Certificate of Registration*

This is to certify that

## **IGNITE ENGINEERING**

**6B, MADHA KOVIL ROAD, K.PUDUR, MADURAI,  
TAMIL NADU, 625007, INDIA**

has been independently assessed by QRO  
and is compliant with the requirement of:

**ISO 9001:2015**

## **Quality Management System**

For the following scope of activities:

**CONDUCTING GREEN, ENERGY AND ENVIRONMENT AUDIT  
TO EDUCATIONAL INSTITUTIONS AND INDUSTRIES.**

Date of Certification: 10th May 2022

2<sup>nd</sup> Surveillance Audit Due: 9th May 2024

1<sup>st</sup> Surveillance Audit Due: 9th May 2023

Certificate Expiry: 9th May 2025

**Certificate Number: 305022071255Q**



*Chunant...*

Head of Certification

Validity of this certificate is subject to annual surveillance audits to be done successfully on or before 365 days from date of the audit.  
(In case surveillance audit is not allowed to be conducted; this certificate shall be suspended / withdrawn).

**The Validity of this certificate can be verified at [www.qrocert.org](http://www.qrocert.org)**

This certificate of registration remains the property of QRO Certification LLP, and shall be returned immediately upon request.

**India Office : QRO Certification LLP**

142, IInd Floor, Avtar Enclave, Near Paschim Vihar West Metro Station, Delhi-110063, (INDIA)

Website : [www.qrocert.org](http://www.qrocert.org), E-mail : [info@qrocert.org](mailto:info@qrocert.org)



Accreditation Certificate No. (011905A)

**Arab Republic of Egypt**  
**Egyptian Accreditation Council (EGAC)**

Certifies that

**QRO Certification LLP**

**(142) - 2<sup>nd</sup> Avtar Enclave - Paschim Vihar**

**Delhi - India**

Has been accredited by EGAC in compliance with the requirements of

**ISO/IEC 17021-1:2015**  
**ISO/IEC 17021-3:2017**  
**ISO 22003-1:2022**

**ISO/IEC 17021-2:2016**  
**ISO/IEC TS 17021-10:2018**  
**ISO 50003:2021**

**In The Field of (QMS, EMS, OHSMS, FSMS, EnMS and MDQMS)**

The scope of accreditation is described in the attached schedule No. (011905B)

Scope Issue No. (03)

Issue No. (03): November 21, 2023

Valid to: November 20, 2027

Subject to continued compliance to the above standard and EGAC requirements

The Company is accredited to grant certification under EGAC Accreditation

In the attached scope of accreditation

EGAC is an MLA Signatory with IAF in the Fields of Accreditation of Product Certification, Certification of Persons and Management System Certification (QMS, EMS, OHSMS, EnMS, FSMS and MDQMS) Bodies

1<sup>st</sup> Accreditation Date: November 21, 2019

Eng. Hanie El Desouki

Executive Director

Eng. Ahmed Samir Saleh

Chairman of EGAC

Egyptian Accreditation Council

Minister of Trade and Industry

70359



Accreditation Certificate No. (011905 A)

**Arab Republic of Egypt  
Egyptian Accreditation Council (EGAC)**

**Certifies that**

**QRO Certification LLP**

**(142) - 2<sup>nd</sup> Avtar Enclave - Paschim Vihar  
Delhi - India**

**Has been accredited by EGAC in compliance with the requirements of**

**ISO/IEC 17021-1:2015  
ISO/IEC 20000-6:2017**

**ISO/IEC 27006:2015  
ISO/IEC 17021-6:2014**

**In The Field of (ISMS, ITMS, BCMS and EOMS )**

**The scope of accreditation is described in the attached schedule No. (011905B)**

**Scope Issue No. (03)**

**Issue No. (03): November 21, 2023**

**Valid to: November 20, 2027**

Subject to continued compliance to the above standard and EGAC requirements  
The Company is accredited to grant certification under EGAC Accreditation  
In the attached scope of accreditation

EGAC is an MLA Signatory with IAF in the Fields of Accreditation of  
Product Certification, Certification of Persons and Management System  
Certification (QMS, EMS, OHSMS, EnMS, FSMS and MDQMS) Bodies

1<sup>st</sup> Accreditation Date: November 21, 2019

**Eng. Hanie El Desouki**

*Hanie El Desouki*

**Executive Director**

**Eng. Ahmed Samir Saleh**

*Ahmed Samir Saleh*

**Chairman of EGAC**

**Egyptian Accreditation Council**

**Minister of Trade and Industry**

**70358**

Ministry of  
Trade and Industry  
Egyptian Accreditation Council  
EGAC



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أريحاك

Schedule of Accreditation  
for Certification Body According to ISO/IEC 17021-1

Issued To

QRO Certification LLP

(142) - 2<sup>nd</sup> Floor Avtar Enclave - Paschim Vihar - Delhi - India

Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. 0:

Valid to: November 20, 2027

IAF Codes No.	Quality Management System ISO 9001:2015
1	Agriculture, forestry and fishing
3	Food products, beverages and tobacco
4	Textiles and textile products
5	Leather and leather products
6	Wood and wood products
7	Limited to "Pulp and paper manufacturing"
10	Manufacture of coke and refined petroleum products
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
20	Shipbuilding.
22	Other transport equipment.
23	Manufacturing not elsewhere classified
28	Construction
29	Wholesale and retail trade; Repair of motor vehicles, motorcycles and personal and household goods.

Kornish El-Maadi, Riad El-Maadi Tower 1 - Cairo - Egypt

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1 / Dec 2018

Page 1 of 7

كورنيش المعادي - برج رياض المعادي ١ - القاهرة - مصر

تليفون: ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

فاكس: ٢٥٢٧٥٢٢٤ (٢٠٢)



Ministry of  
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Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. 0: Valid to: November 20, 2027

30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
33	Information technology.
34	Engineering services
35	Other services.
36	Public administration.
37	Education.
38	Health and social work

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Page 2 of 7

Industrial Investment Man: <http://investor.eg> : مصر للصناعة والاستثمار الصناعي، في مصر

كورنيش المعادي - القاهرة - مصر  
تليفون : ٢٥٢٧٥٢٢٠ / ٥ / ٦ / ٧ (٢٠٢)  
فاكس : ٢٥٢٧٥٢٢٤ (٢٠٢)

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Schedule No.: 011905B

1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023

Revision No. 0:

Valid to: November 20, 2027

IAF Codes No.	Environmental Management System ISO14001:2015
3	Food products, beverages and tobacco
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
15	Non-metallic mineral products
16	Concrete, cement, lime, plaster, etc.
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
22	Other transport equipment.
28	Construction
30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
33	Information technology.
34	Engineering services
37	Education.
38	Health and social work

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تيلوفون: ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

فاكس: ٢٥٢٧٥٢٢٤ (٢٠٢)

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Schedule No.: 011905B

1<sup>st</sup> Accreditation date: November 21, 2019

Issue No. (03): November 21, 2023

Revision No. (0):

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IAF Codes No. Health and Safety Management System ISO 45001:2018

3	Food products, beverages and tobacco
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
15	Non-metallic mineral products
16	Concrete, cement, lime, plaster, etc.
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
22	Other transport equipment.
28	Construction
30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
33	Information technology.
34	Engineering services
37	Education.
38	Health and social work

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Ministry of  
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Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. (0):

Valid to: November 20, 2027

Food Safety Management System ISO 22000:2018 According to ISO 22003-1:2022

Cluster	Category	Sub-category			
		C0	C1	CII	CIV
Processing food for humans and animals	Food ingredient and pet food processing	C0	Animal – Primary conversion		
		C1	Processing of perishable animal products		
		CII	Processing of perishable plant products		
		CIII	Processing of perishable animal and plant products		
Catering/food service	Catering/food service	CIV	Processing of ambient stable products		
Retail, transport and storage	Trading, retail and e-commerce	E			
		F		FI	Retail/ wholesale
		G		FII	Brokering/ trading
	Transport and storage services				

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كورنيش المعادي - برج ريبض المعادي - القاهرة - مصر

تلفون : ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

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Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. (0):

Valid to: November 20, 2027

Medical Device Quality Management Systems ISO 13485:2016 According to IAF MD 9	
Main Technical Areas	Technical Areas
Non-active Medical Devices	General non-active, non-implantable medical devices
	Non-active implants
	Devices for wound care
	Non-active dental devices and accessories
In Vitro Diagnostic Medical Devices (IVD)	Non-active medical devices other than specified above
	Reagents and reagent products, calibrators, and control materials for: <ul style="list-style-type: none"><li>• Clinical Chemistry</li><li>• Immunochemistry (Immunology)</li><li>• Haematology/Haemostasis/</li><li>• Immunohematology</li><li>• Microbiology</li><li>• Infectious Immunology</li><li>• Histology/Cytology</li><li>• Genetic Testing</li></ul>
	IVD Instruments and software
	IVD medical devices other than specified above

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تلفون : ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

فاكس : ٢٥٢٧٥٢٢٤ (٢٠٢)

**Schedule of Accreditation**  
for Certification Body According to ISO/IEC 17021-1

Issued To

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(142) - 2<sup>nd</sup> Floor Avatar Enclave - Paschim Vihar - Delhi - India

Schedule No.: 011905B

1<sup>st</sup> Accreditation date: November 21, 2019

Issue No. (03): November 21, 2023

Revision No. 0):

Valid to: November 20, 2027

**Information Security Management Systems ISO 27001:2013 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 27006: 2015**

**Energy Management Systems ISO 50001:2018 According to 50003:2021**

**Information technology Management Systems ISO/IEC 20000-1:2018 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 20000-6:2017**

**Business continuity Management Systems ISO 22301:2019 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 17021-6:2014**

**Educational organization Management Systems ISO 21001:2018 In accordance with ISO/IEC 17021-1: 2015**

This conformity assessment body (CAB) is recorded as issuing EGAC accredited certificates to organizations in the countries listed below. This list is current at the time of issue of this scope of accreditation.

India	Egypt	Jordan	Nigeria	Romania	Bulgaria
Note* :- Locations where certification activities covered by the above Accreditation Standard are undertaken 142, 2 <sup>nd</sup> Floor Avatar Enclave, Paschim Vihar, Delhi , India					



# Green International

Experts in Project Management Consulting & Training

This is to certify that

Mr. P.Vivek

has attended / successfully completed

LEED Green Associate

as per the standard of

“USGBC Green Building Principles”

Duration : 16 Hrs / 12 PDU's      Start Date : 13 Jun 2015      End Date : 24 Jun 2015

Geetha Ravichandran, M.E, PMP, LEED AP,

Faculty / Program Coordinator

Course ID : GIGA0400

Certificate Number : GIGA-791



To verify the authenticity of this certificate, log on to  
[www.greenmtc-int.com/certificate\\_verification.aspx](http://www.greenmtc-int.com/certificate_verification.aspx)



# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**S.KARTHIGA**

Has successfully passed all the course assessment requirements

### **ISO 14001:2015 Lead Auditor (Environmental Management Systems) Training Course**

CQI & IRCA Course No : 1709

Certificate Number : TVEE06031277

CQI Unique Delegate ID No : 350909

Course End Date : 31<sup>st</sup> Jan 2022

Issue Date : 03<sup>rd</sup> June 2022



**RAJALAKSHMI BASKARAN**  
Course Director



*The Certificate is valid for 5 years for the purpose of Auditor Certification by IRCA  
For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)*





# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**P. VIVEK**

has successfully passed the examination of the CQI & IRCA Certified

**ISO 9001:2015 Lead Auditor  
(Quality Management Systems)  
Training Course**

*Organized in Co-operation with*



*DRV Certification Services, India*

CQI & IRCA Course No : 17980 Certificate Number: TVEQ12142154

CQI Unique Delegate ID No : 147061 Course Dates : Nov - Dec 2018

(Weekend Programme)



CERTIFIED COURSE

Course Director



For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)



# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**P. VIVEK**

has successfully passed the examination of the CQI & IRCA Certified

**ISO 45001:2018 Lead Auditor**  
(Occupational Health and Safety Management Systems)  
Training Course

*Organized in Co-operation with*



*DRV Certification Services, India*

CQI & IRCA Course No : 1878 Certificate Number: TVEH06212158

CQI Unique Delegate ID No : 187536 Course Dates : May - Jun 2019  
(Weekend Programme)



CQI



IRCA

CERTIFIED COURSE

Course Director



For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)

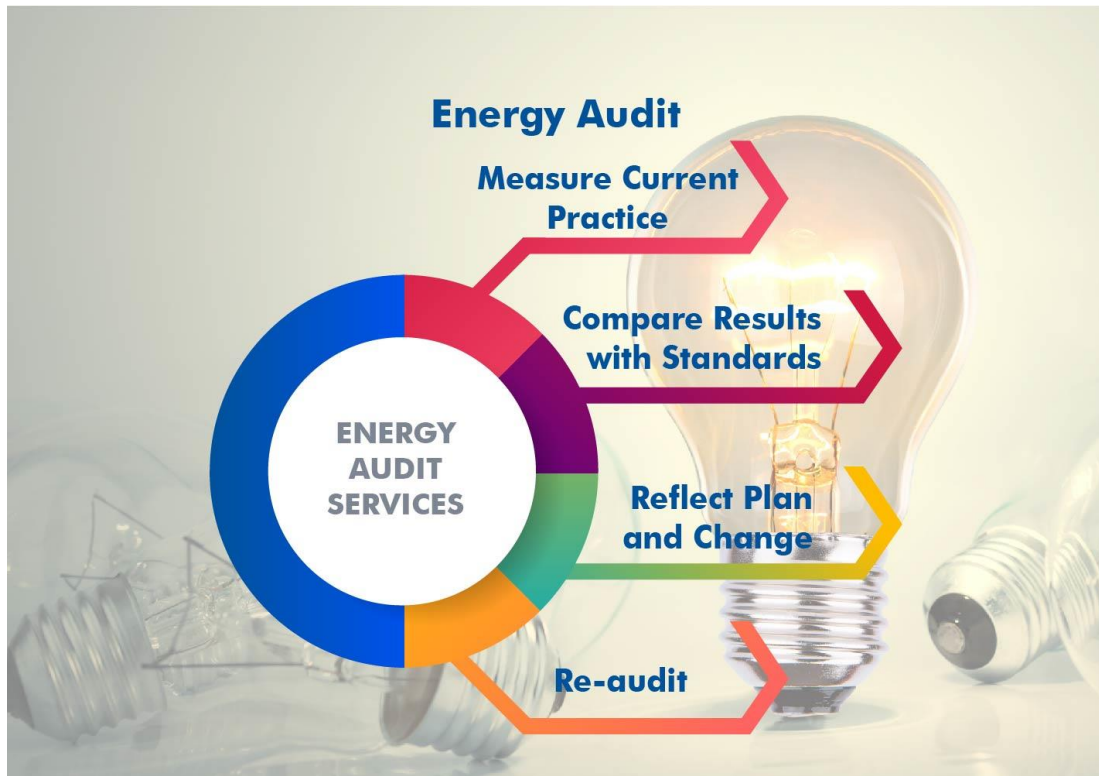


# GANESAR COLLEGE OF ARTS AND SCIENCE

(Accredited with 'B' grade by NAAC)

MELAISIVAPURI - 622 403, PUDUKKOTTAI, TAMILNADU

Phone: 04333 - 247218, 247603



## ENERGY AUDIT REPORT



# ENERGY AUDIT REPORT



## GANESAR COLLEGE OF ARTS & SCIENCE



GANESAR COLLEGE OF ARTS AND SCIENCE

Affiliated to Bharathidasan University  
Nationally Accredited with 'B' Grade by NAAC



*Report by*

February 2023

**IGNITE ENGINEERING**

38/2, F1 Ranga Flats, Chrompet, Chennai - 600044  
e-mail: [igniteengg@gmail.com](mailto:igniteengg@gmail.com) mobile number: 8438218994

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## **1. ABOUT THE COLLEGE**

Ganesar College of Arts & Science has become the crown jewel in the field of Arts & Science education since its inception.

Located at 15 kms Away from Singampurni town GCAS is perched amidst a sprawling where 3 acres is dedicated for the institution, with a robust contemporary architecture befitting global standards.

Affiliated by Bharathidasan University With Highest Quality Standard in the institution has dawned as a present day doyen of arts & Science Education. The institution aims at moulding students into technologically sound, efficient, creative and responsible global citizens capable of engaging with next generation challenges. GCAS is run by a team of eminent educationists whose dedication, commitment and expertise impart quality education, blended with a contemporary, yet pragmatic touch.

### **VISION**

To enable the young learners of this draught-prone area to receive higher education and to shape their personality and thereby make them good and successful citizens of our nation.

### **MISSION**

- To serve the poor, downtrodden, and needy students to receive quality education.
- To motivate the students to gain knowledge with self-confidence by offering good academic exposure.
- To inspire the students to realize the greatness of our traditional and cultural values which would rightly chisel their personality
- To make use of all the possible opportunities to inculcate the spirit of research and creativity in their minds.
- To develop employability skills in them to make them reach higher goals in their life.

## **2. INTRODUCTION**

The Energy Conservation Act, 2001 defines Energy Audit as "the verification, monitoring, and analysis of the use of energy including submission of technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption".

It is an analysis of energy flows for energy conservation and to find energy losses. It is a process of collection of detailed data related to energy usage and comparison of collected results. It is a process by which we can reduce the amount of energy input to the system without a negative impact on the output.

It includes Inspection, Survey and Analysis of energy flows for energy conservation in a building, a process, or a system to reduce the amount of energy input into the system without negatively affecting the output(s) plugged. It is the quickest, cheapest, and cleanest way to reduce energy consumption.

An energy audit, sometimes referred to as an energy survey or an energy inventory, is an examination of the total energy used in a particular property. The analysis is designed to provide a relatively quick and simple method of determining not only how much energy is being consumed but where and when.

The energy audit will also identify deficiencies in operating procedures and in physical facilities. Once these deficiencies have been identified, it will be apparent where to concentrate efforts to save energy. The energy audit is the beginning of and the basis for an effective energy-management programme.

Increasingly in the last several decades, the demand to lower increasingly expensive energy costs and move towards a sustainable future has made energy audits greatly important.

### 3. OBJECTIVES OF ENERGY AUDIT





## **4. BENEFITS OF ENERGY AUDIT**

- Energy audits will evaluate your facility “as a whole”, their goal is not to evaluate single measures but to consider a wide range of available alternatives (Electrical, Mechanical, Envelope and Water).
- It will analyse your historical energy use and find potential issues using statistical methods.
- The audit will not only inform you of opportunities but provide you with financial analysis. This will enable prioritization based on financial benefit and return on investment.
- Provide you with solid, easy-to-understand technical information regarding the proposed energy conservation measures
- Provide you with benchmark information to help you understand your energy use performance compared to others in your field and area.
- Provide you with an emissions analysis to help you understand the benefits of your decisions from an environmental standpoint.
- Understand where energy is used, and which areas are worth focusing on the most (energy hogs).
- The cost-benefit analysis of the audit report would help decision-makers prioritize opportunities and evaluate them as investments.
- These indicators would include, rate of return, net present value, cash flow analysis, and payback.

## **5. STAGES OF ENERGY AUDIT**

A structured methodology to carry out an energy audit is necessary for efficient working. An initial study of the site should always be carried out, as the planning of the procedures necessary for an audit is most important.

The stages of an energy audit are:

- Phase – I Pre-audit phase
- Phase – II Audit phase
- Phase – III Post-audit phase

### **Phase – I Pre-audit phase**

An initial site visit may take one day and gives the Energy Auditor/Engineer an opportunity to meet the personnel concerned, familiarize him with the site, and assess the procedures necessary to carry out the energy audit.

During the initial site visit, the Energy Auditor/Engineer should carry out the following actions:-

- Discuss with the site's senior management the aims of the energy audit.
- Discuss economic guidelines associated with the recommendations of the audit.
- Analyse the major energy consumption data with the relevant personnel.
- Obtain site drawings where available - building layout, steam distribution, compressed air distribution, electricity distribution etc. the site accompanied by engineering/production.

The main aims of this visit are: -

- To finalise the Energy Audit team
- To identify the main energy-consuming areas/plant items to be surveyed during the audit.
- To identify any existing instrumentation/ additional metering required.
- To decide whether any meters will have to be installed prior to the audit eg. kWh, steam, oil, or gas meters.
- To identify the instrumentation required for carrying out the audit.
- To plan with time frame
- To collect macro data on plant energy resources, major energy consuming centers
- To create awareness through meetings/ programme

### **Phase – II Audit phase**

The information to be collected during this audit phase includes:

- Energy consumption by type of energy, by department, by major items of process equipment, by end-use
- Material balance data (raw materials, intermediate and final products, recycled materials, use of scrap or waste products, production of by-products for re-use in other industries, etc.)
- Energy cost and tariff data
- Process and material flow diagrams
- Generation and distribution of site services (eg.compressed air, steam).
- Sources of energy supply (e.g. electricity from the grid or self-generation)
- Potential for fuel substitution, process modifications, and the use of co-generation systems (combined heat and power generation).
- Energy Management procedures and energy awareness training programs within the establishment.

### **Phase – III Post-audit phase**

- Plan and schedule an action plan for implementing the corrective measures.
- Follow-up and periodic review.

## **6. ENERGY MANAGEMENT**

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. The study carried out also analyzed the use of alternate energy resources that are eco-friendly.

## **7. OBSERVATIONS**

The source of energy for all the buildings within the campus is electricity only. The institution consumes about **1400kW/Month**. However, Nominal Amount of the daily electricity requirement is supplied from **solar energy**.

The campus contains Lights and fans in use. The entire campus including common facility centers are equipped with LED lamps and LED tube lights, except at few locations. Besides this, photovoltaic cells are also installed in the campus as an alternate renewable source of energy.

Computers are set to automatic power saving mode when not in use. Solar water heaters are installed in hostel buildings as to promote renewable energy. Also, campus administration runs switch-off drill on regular basis. Equipment like Computers is used in power saving mode.

## 7.1 Solar panels

Solar panel systems are extremely durable and require little to no maintenance over their productive lifetime, which can span 25 years or more. Solar systems are also extremely easy to maintain. The main maintenance that these panels require is an occasional dusting to remove dirt, leaves, or any other fragments. Each kilowatt-hour (kWh) of solar that is generated will substantially reduce greenhouse gas emissions like CO<sub>2</sub>, as well as other dangerous pollutants such as sulfur oxides, nitrogen oxides, and particulate matter.



*Solar panels in the campus*



*Solar panels in all around the campus*

## 7.2 Diesel generator

The college campus is Equipped With Diesel Generators for power back up. The generators were tested for their efficiency, and physical and operating conditions and found to be fit.



*Diesel Generators Inside the Campus*



## **8. Carbon Foot Printing**

Carbon Footprint refers to the potential climatic impact (Global Warming) of the Greenhouse Gases (GHG) emitted directly or indirectly due to an organization's activities. A Carbon Footprint Disclosure of any educational institution is very important to understand such that its key emission sources can be identified and necessary mitigation measures can be adopted for carbon reduction. In today's date, very few colleges disclose their carbon emissions. GCAS under Bharathidasan University has taken an initiative to compute its carbon footprint and set a benchmark for other Colleges/Universities. The college has adopted a carbon reduction strategy to undertake this project.

### **8.1 Objectives Of Carbon Foot Printing**

- Identify key emission sources of GHG at the campus
- Compute Scopes of emissions for operations carried out at GCAS Campus
- Analyze the results and provide cost effective & efficient measures for reducing the GHG emissions.

### **8.2 CARBON FOOT SURVEY & ESTIMATION INSIDE THE CAMPUS**

<b>Sl.No</b>	<b>Mode of Transport</b>	<b>No of Vehicles</b>	<b>Travellers</b>	<b>To &amp; Fro Km/Per</b>
1	Two Wheelers (Single/Shared)	250	500	20
2	Share Auto	15	75	15
3	Own Car (Single/Shared)	15	30	20
4	Mini Bus / Private Van	3	200	30
5	Public Transportation / College Bus	20	600	30
6	Bicycles	10	10	3
7	By Walk	-	50	1.5



Sl.No	Description	Emission Rate	Annual Consumption/Quantity	Eqt.Co <sub>2</sub> Tonnes/Year
I	Electrical Energy consumption	0.80 kg/kwh	12852kwh	101.85
	Diesel consumption	2.653 kg of Co <sub>2</sub> /litre	6000litres	15.92
	LPG	2.983 kg of Co <sub>2</sub> /kg	1786kg	4.21
II	Food Waste	1.9 kg of Co <sub>2</sub> /kg	3.75 T	7.125
	Paper Waste	1.725 kg of Co <sub>2</sub> /kg	5.85 T	12.09
	Water Waste	0.298 kg of Co <sub>2</sub> /kl	1760kl	0.524
	Plastic Waste	6 kg of Co <sub>2</sub> /kg	200 kg	1.2
	Glass/Other	0.77 kg of Co <sub>2</sub> /kg	10	0.065
	Sanitary Napkin	0.5 kg of Co <sub>2</sub> /kg	2275 kg	1.1262
III	Two Wheelers	2.38 kg of Co <sub>2</sub> /L	10000*250/50=50000	97.21
	Share Auto	2.653 kg of Co <sub>2</sub> /L	1200*250/30=10000	26.53
	Own Car	2.653 kg of Co <sub>2</sub> /L	800*250/20=10000	26.23
	Mini Bus / Van	2.653 kg of Co <sub>2</sub> /L	90*250/8=2812	7.46
	Bus	2.653 kg of Co <sub>2</sub> /L	3000*250/30(5*50)=90000	147.32
IV	Events	Approx	500*8*1.5=6000kg	15.92
<b>Total</b>				<b>438.550</b>

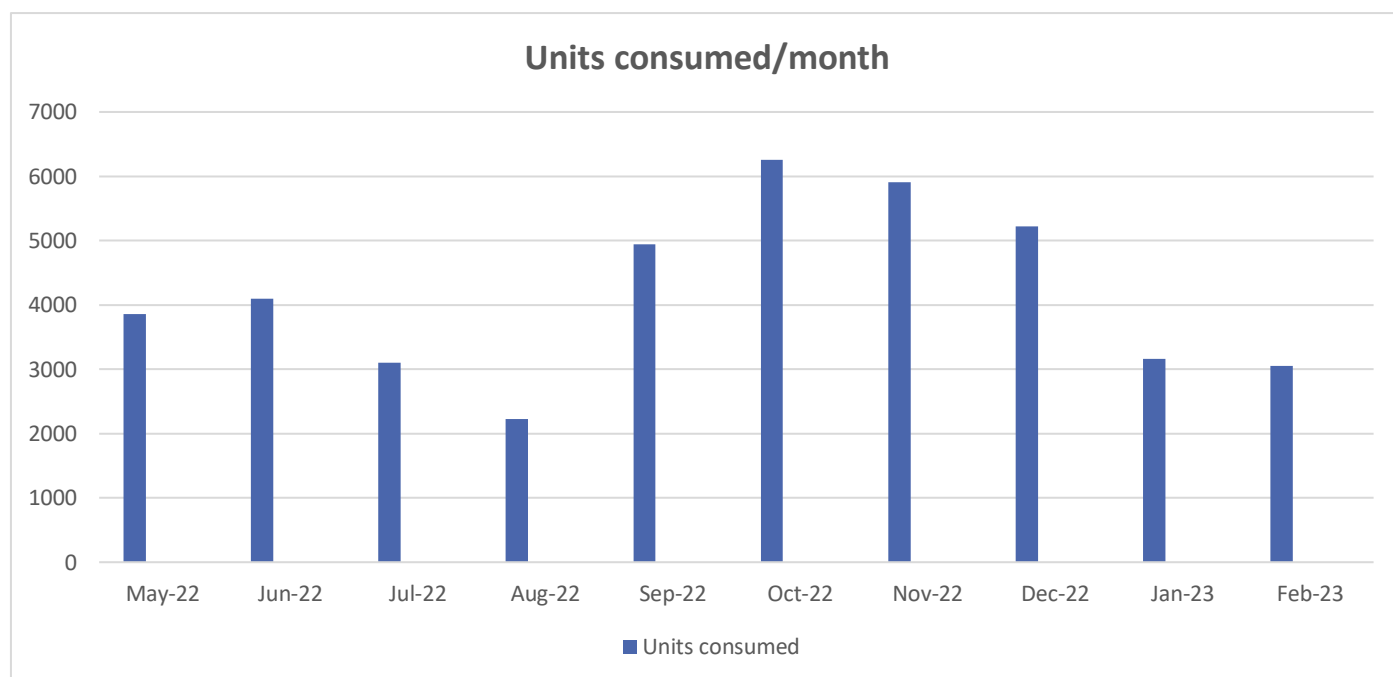
## **Recommendations**

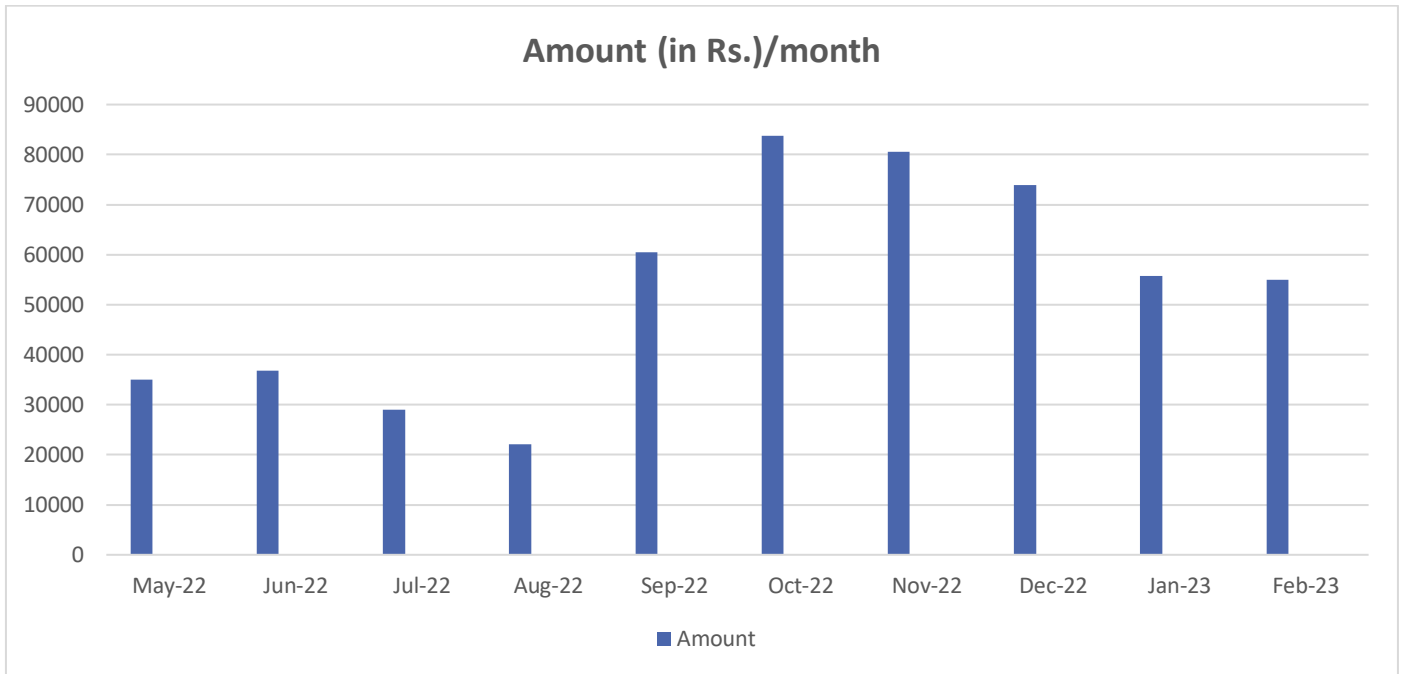
- Retrofitting of the old air conditioners should be done in order to prevent any leakage.
- Regular maintenance of the air conditioners and refrigerators should be done and records should be maintained
- Reheating of food can be done on induction / microwave minimizing the use of LPG.
- The waste from compost pit can be used to generate biogas and the same pipeline may be extended to cafeteria for cooking.
- sub-metering system for electricity usage may help to identify high energy consumption areas.
- Posters should be displayed across the college, spreading awareness among the students, teachers and other staff members to switch off the lights and fans when not in use, switching off microwaves after use etc.
- The systems (computers, laptops, air conditioners, refrigerators etc.) should be procured for the college considering the latest energy efficient technologies in the markets. (For ex All in One Units etc.)
- Occupancy sensors should be installed in the classrooms and offices.
- LED lights should be installed in phase wise manner.

## 8. POWER CONSUMPTION ANALYSIS

The power consumed by the college for a year on a monthly basis is depicted below:

S.No	Month/year	Units consumed (kw/h)	Bill amount
1	05/2022	3860	34997
2	06/2022	4093	36812
3	07/2022	3102	29024
4	08/2022	2229	22118
5	09/2022	4946	60444
6	10/2022	6256	83720
7	11/2022	5905	80496
8	12/2022	5218	73901
9	01/2023	3162	55760
10	02/2023	3049	54944





## 9. POWER QUALITY AUDIT

A power quality audit checks the reliability, efficiency, and safety of an organization's electrical system. The audit verifies the following aspects:

**The continuity of the power supply:** It checks if the power in the network is available on a regular basis and can ensure the efficient operation of the equipment.

**The quality of the voltage:** It checks if there are no low or high-frequency disturbances in the network capable of damaging the system components.

## **Benefits Of Power Quality Analysis**

- Assist in preventative and predictive maintenance
- Identify source and frequency of events
- Establish precise location and timing of events
- Develop maintenance schedules
- Monitor and trend conditions
- Analyse harmonics, Flicker, Transients frequency variation, voltage variations (sag & swell).
- Ensure equipment performance
- Assess the sensitivity of process equipment to disturbances
- Evaluate performance against specifications

## **10. THERMOGRAPHIC SURVEY**

It is a visual investigation, carried out by a qualified engineer, to detect abnormally high temperatures within an electrical installation. A higher-than-normal temperature indicates a problem within a system that could have serious consequences if allowed to escalate. Thermographic surveys have become increasingly sought after within the building construction industry for both new builds and existing properties. Thermal Imaging Surveys provide an instant non-disruptive image of a building fabric which identifies uncontrolled air leakage pathways, cold bridging, and insulation defects.

Thermographers use a thermographic camera to detect thermal signatures and assess the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths. These results are then summarised in a report which can be used to improve the efficiency of heating and in some cases, air conditioning units.

Thermography (thermal imaging) makes it possible to identify electrical defects such as loose connections and overloaded circuits (the most common cause of electrical fires), transformer cooling faults, motor winding faults, and induced currents.

A thermographic survey inspects electrical equipment including distribution fuse boards, MCB boards, contactors, switchboards, transformers, motors, battery banks, UPSs, control panels, switch fuses and isolators, etc whilst the equipment is in operation, causing no disruption to business operations.

## 11. RECOMMENDATIONS

- The management should support more of renewable and carbon-neutral electricity options in any energy- purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.
- More LED lights should be installed to reduce the power consumed for lighting.
- The campus administration should run switch–off drills on regular basis.
- In campus premises electricity should be shut down from main building supply after occupancy time, to prevent power loss due to eddy current.
- 5–star rated Air Conditioners, Fans and CFLs should be used.
- Cleaning of tube-lights/bulbs to be done periodically, to remove dust over it.

## 12. CONCLUSION

### Energy Rating

After the complete survey and analysis of the campus as per ISO 50001:2018 energy management system standards, we rate the campus **Score 4/5**.

Energy Conservation is the wave of the future. The world is quickly moving towards Energy sustainability. An energy-efficient organization is a step toward the direction of renewable energy, environmental protection, and sustainable living. Thus, concluded that by energy auditing we identify cost-effective ways to improve the comfort and efficiency of buildings.

### **13. ACKNOWLEDGEMENT**

We are grateful to the management and committee members of Ganesar College Of arts & Science to award this prestigious project on energy auditing. Further, we sincerely thank the college staff for providing us with the necessary facilities and cooperation during the audit. This ample co-operation helped us a lot in making this audit possible and successful.

**FOR IGNITE ENGINEERING**

A handwritten signature in blue ink, appearing to be 'Vivek M.E.', is positioned above the name. The signature is stylized and written in a cursive-like font.

**ER.P.VIVEK M.E**

**CHARTERED ENGINEER &COMPETENT PERSON**





# *Certificate of Registration*

This is to certify that

## **IGNITE ENGINEERING**

**6B, MADHA KOVIL ROAD, K.PUDUR, MADURAI,  
TAMIL NADU, 625007, INDIA**

has been independently assessed by QRO  
and is compliant with the requirement of:

**ISO 9001:2015**

## **Quality Management System**

For the following scope of activities:

**CONDUCTING GREEN, ENERGY AND ENVIRONMENT AUDIT  
TO EDUCATIONAL INSTITUTIONS AND INDUSTRIES.**

Date of Certification: 10th May 2022

2<sup>nd</sup> Surveillance Audit Due: 9th May 2024

1<sup>st</sup> Surveillance Audit Due: 9th May 2023

Certificate Expiry: 9th May 2025

**Certificate Number: 305022071255Q**



*Chunant...*

Head of Certification

Validity of this certificate is subject to annual surveillance audits to be done successfully on or before 365 days from date of the audit.  
(In case surveillance audit is not allowed to be conducted; this certificate shall be suspended / withdrawn).

**The Validity of this certificate can be verified at [www.qrocert.org](http://www.qrocert.org)**

This certificate of registration remains the property of QRO Certification LLP, and shall be returned immediately upon request.

India Office : QRO Certification LLP

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Website : [www.qrocert.org](http://www.qrocert.org), E-mail : [info@qrocert.org](mailto:info@qrocert.org)



Accreditation Certificate No. (011905A)

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**Delhi - India**

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**ISO/IEC 17021-3:2017**  
**ISO 22003-1:2022**

**ISO/IEC 17021-2:2016**  
**ISO/IEC TS 17021-10:2018**  
**ISO 50003:2021**

**In The Field of (QMS, EMS, OHSMS, FSMS, EnMS and MDQMS)**

The scope of accreditation is described in the attached schedule No. (011905B)

Scope Issue No. (03)

Issue No. (03): November 21, 2023

Valid to: November 20, 2027

Subject to continued compliance to the above standard and EGAC requirements

The Company is accredited to grant certification under EGAC Accreditation

In the attached scope of accreditation

EGAC is an MLA Signatory with IAF in the Fields of Accreditation of Product Certification, Certification of Persons and Management System Certification (QMS, EMS, OHSMS, EnMS, FSMS and MDQMS) Bodies

1<sup>st</sup> Accreditation Date: November 21, 2019

**Eng. Hanie El Desouki**

**Executive Director**

**Eng. Ahmed Samir Saleh**

**Chairman of EGAC**

**Egyptian Accreditation Council**

**Minister of Trade and Industry**

**70359**



Accreditation Certificate No. (011905 A)

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ISO/IEC 20000-6:2017**

**ISO/IEC 27006:2015  
ISO/IEC 17021-6:2014**

**In The Field of (ISMS, ITMS, BCMS and EOMS )**

**The scope of accreditation is described in the attached schedule No. (011905B)**

**Scope Issue No. (03)**

**Issue No. (03): November 21, 2023**

**Valid to: November 20, 2027**

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*Hanie El Desouki*

**Executive Director**

**Eng. Ahmed Samir Saleh**

*Ahmed Samir Saleh*

**Chairman of EGAC**

**Egyptian Accreditation Council**

**Minister of Trade and Industry**

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Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. 0:

Valid to: November 20, 2027

IAF Codes No.	Quality Management System ISO 9001:2015
1	Agriculture, forestry and fishing
3	Food products, beverages and tobacco
4	Textiles and textile products
5	Leather and leather products
6	Wood and wood products
7	Limited to "Pulp and paper manufacturing"
10	Manufacture of coke and refined petroleum products
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
20	Shipbuilding.
22	Other transport equipment.
23	Manufacturing not elsewhere classified
28	Construction
29	Wholesale and retail trade; Repair of motor vehicles, motorcycles and personal and household goods.

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فاكس: ٢٥٢٧٥٢٢٤ (٢٠٢)

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30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
33	Information technology.
34	Engineering services
35	Other services.
36	Public administration.
37	Education.
38	Health and social work

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Revision No. 0:

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IAF Codes No.	Environmental Management System ISO14001:2015
3	Food products, beverages and tobacco
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
15	Non-metallic mineral products
16	Concrete, cement, lime, plaster, etc.
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
22	Other transport equipment.
28	Construction
30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
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Schedule No.: 011905B

1<sup>st</sup> Accreditation date: November 21, 2019

Issue No. (03): November 21, 2023

Revision No. (0):

Valid to: November 20, 2027

IAF Codes No. Health and Safety Management System ISO 45001:2018

3	Food products, beverages and tobacco
12	Chemicals, chemical products and fibres
14	Rubber and plastic products
15	Non-metallic mineral products
16	Concrete, cement, lime, plaster, etc.
17	Basic metals and fabricated metal products.
18	Machinery and equipment.
19	Electrical and optical equipment.
22	Other transport equipment.
28	Construction
30	Hotels and restaurants
32	Financial intermediation; real estate; renting.
33	Information technology.
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Valid to: November 20, 2027

Food Safety Management System ISO 22000:2018 According to ISO 22003-1:2022

Cluster	Category	Sub-category			
		C0	C1	CII	CIV
Processing food for humans and animals	Food ingredient and pet food processing	C0	Animal – Primary conversion		
		C1	Processing of perishable animal products		
		CII	Processing of perishable plant products		
		CIII	Processing of perishable animal and plant products		
Catering/food service	Catering/food service	CIV	Processing of ambient stable products		
Retail, transport and storage	Trading, retail and e-commerce	E			
		F		FI	Retail/ wholesale
		G		FII	Brokering/ trading
	Transport and storage services				

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كورنيش المعادي - القاهرة - مصر

كورنيش المعادي - برج رياض المعادي - القاهرة - مصر

تلفون : ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

فاكس : ٢٥٢٧٥٢٢٤ (٢٠٢)



Ministry of  
Trade and Industry  
Egyptian Accreditation Council  
EGAC



وزارة التجارة والصناعة  
المجلس الوطني  
للاعتدال  
ايجاك

Schedule of Accreditation  
for Certification Body According to ISO/IEC 17021-1

Issued To

QRO Certification LLP

(142) - 2<sup>nd</sup> Floor Avatar Enclave - Paschim Vihar - Delhi - India

Schedule No.: 011905B 1<sup>st</sup> Accreditation date: November 21, 2019 Issue No. (03): November 21, 2023 Revision No. (0):

Valid to: November 20, 2027

Medical Device Quality Management Systems ISO 13485:2016 According to IAF MD 9	
Main Technical Areas	Technical Areas
Non-active Medical Devices	General non-active, non-implantable medical devices
	Non-active implants
	Devices for wound care
	Non-active dental devices and accessories
In Vitro Diagnostic Medical Devices (IVD)	Non-active medical devices other than specified above
	Reagents and reagent products, calibrators, and control materials for:
	<ul style="list-style-type: none"><li>• Clinical Chemistry</li><li>• Immunochemistry (Immunology)</li><li>• Haematology/Haemostasis/</li><li>• Immunohaematology</li><li>• Microbiology</li><li>• Infectious Immunology</li><li>• Histology/Cytology</li><li>• Genetic Testing</li></ul>
	IVD Instruments and software
	IVD medical devices other than specified above

Kornish El-Maadi, Riad El-Maadi Tower 1 - Cairo - Egypt

Tel.: (202) 25275220/5/6/7

Fax: (202) 25275224

F4W16C

1 / Dec 2018

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كورنيش المعادي - برج رياض المعادي ١ - القاهرة - مصر

تلفون : ٢٥٢٧٥٢٢٠/٥/٦/٧ (٢٠٢)

فاكس : ٢٥٢٧٥٢٢٤ (٢٠٢)

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Valid to: November 20, 2027

**Information Security Management Systems ISO 27001:2013 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 27006: 2015**

**Energy Management Systems ISO 50001:2018 According to 50003:2021**

**Information technology Management Systems ISO/IEC 20000-1:2018 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 20000-6:2017**

**Business continuity Management Systems ISO 22301:2019 In accordance with ISO/IEC 17021-1: 2015 & ISO/IEC 17021-6:2014**

**Educational organization Management Systems ISO 21001:2018 In accordance with ISO/IEC 17021-1: 2015**

This conformity assessment body (CAB) is recorded as issuing EGAC accredited certificates to organizations in the countries listed below. This list is current at the time of issue of this scope of accreditation.

India	Egypt	Jordan	Nigeria	Romania	Bulgaria
Note* :- Locations where certification activities covered by the above Accreditation Standard are undertaken 142, 2 <sup>nd</sup> Floor Avatar Enclave, Paschim Vihar, Delhi , India					



ASPIRA CERTIFICATIONS  
www.aspirationscertifications.com

# Certificate of Achievement

This is to certify that

**P.VIVEK**

(CQI ULN : AC/ENMS/0521)

has successfully passed all the course assessment requirements for PR366 ISO  
50001 : 2018 (Energy Management System) Lead Auditor Training Course

Course Start Date : 15.03.2021

Certificate No : 2021ENMS1466

Course End Date : 20.03.2021

Course No : 2318



Approved by:

Managing Director

S.No : ENMS/5689/2021 The Certificate is valid for 5 years from the date above for the purpose of registering as an auditor with IRCA

For authenticity of this certificate, visit, [www.aspirationscertifications.com](http://www.aspirationscertifications.com)



# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**S.KARTHIGA**

Has successfully passed all the course assessment requirements

### **ISO 14001:2015 Lead Auditor (Environmental Management Systems) Training Course**

CQI & IRCA Course No : 1709

Certificate Number : TVEE06031277

CQI Unique Delegate ID No : 350909

Course End Date : 31<sup>st</sup> Jan 2022

Issue Date : 03<sup>rd</sup> June 2022



**RAJALAKSHMI BASKARAN**  
Course Director



*The Certificate is valid for 5 years for the purpose of Auditor Certification by IRCA  
For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)*



# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**P. VIVEK**

has successfully passed the examination of the CQI & IRCA Certified

**ISO 9001:2015 Lead Auditor  
(Quality Management Systems)  
Training Course**

*Organized in Co-operation with*



*DRV Certification Services, India*

CQI & IRCA Course No : 17980

Certificate Number: TVEQ12142154

CQI Unique Delegate ID No : 147061

Course Dates

: Nov - Dec 2018

(Weekend Programme)



CQI



IRCA

CERTIFIED COURSE

Course Director



For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)



# TVE International Academy Pvt. Ltd.

## Certificate of Achievement

This is to certify that

**P. VIVEK**

has successfully passed the examination of the CQI & IRCA Certified

**ISO 45001:2018 Lead Auditor**  
(Occupational Health and Safety Management Systems)  
Training Course

*Organized in Co-operation with*



*DRV Certification Services, India*

CQI & IRCA Course No : 1878 Certificate Number: TVEH06212158  
CQI Unique Delegate ID No : 187536 Course Dates : May - Jun 2019  
(Weekend Programme)



CQI



IRCA

CERTIFIED COURSE

Course Director



For current validity of the certificate, visit [www.tvecert.org](http://www.tvecert.org)