TECHNICAL REPORT OF WASTE MANAGEMENT AUDIT

Submitted to

S.A. ENGINEERING COLLEGE (AUTONOMOUS), THIRUVERKADU, CHENNAI – 600 077, TAMIL NADU.

Date of Audit: 27.10.2022

Submitted by

NATURE SCIENCE FOUNDATION

(A Unique Research and Development Centre for Society Improvement)

ISO 9001:2015, 14001:2015, 45001:2018 & 50001:2018 Certified and Ministry of MSME Registered Organization

No. 2669, LIG-II, , Gandhi Managar, Peelamedu

Coimbatore - 641 004, Tamil Nadu, India.

Phone: 0422 2510006, Mobile: 9566777255, 9566777258

Email: director@nsfonline.org.in, directornsf@gmail.com

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1. Introduction

Waste management audit is all about the “Waste control or waste disposal is all the behaviours and acts necessary to handle the waste from its inception to its final disposal. This involves, but is not limited to, storage, transport, management and recycling of waste along with control and enforcement. It also covers the legislative and regulatory system for waste control, including recycling guidelines. Wastes are generated from several sources such as domestic, industries, agriculture and commercial activities which in turn to cause environmental pollution. Domestic waste include kitchen wastes like vegetables, fruits, and other food waste, Sewage-human excreta and waste from bathrooms and kitchens, Garbage-newspapers, rags, hair, house dust and others wastes like plastic bags, bottles, tins and etc. In general, domestic waste is referred to as refuse (Amasuomo and Baird, 2016). About 90% of domestic wastes are directly dumped on land thereby increasing land or soil pollution. All Industries generate waste materials either directly or indirectly. The wastes typically include ashes, rubbish, building material wastes, toxic wastes, metal containers, plastic containers, paints, oils, and other complex synthetic materials. The industrial wastes include (i) Mining operations leave tailings (rocks of little or no value) as waste, (ii) Metallurgical industries release waste like slag and scrap metal, (iii) Paper and pulp mills release effluents containing wood chips, bits of bark, cellulose fibres, and a number of chemicals, (iv) Oil refineries and petrochemical units release a mixture of wastes containing hydrocarbons, organic acids, and sulphur compounds and (v) Food processing units such as dairy, breweries, and meatpacking units release organic wastes.

Modern techniques employed in agriculture and the use of a variety of chemicals have contributed to the production of large quantities of agricultural waste. The agricultural waste includes (i) Agricultural wastes include crop residues like husk and straws, farm animal waste, and chemicals like pesticides, rodenticides, fungicides, herbicides, and fertilizers, (ii) These wastes can enter the water table as runoff from agricultural fields and (iii) Chemicals used in agriculture are toxic in nature. A lot of wastes is generated from commercial establishments such as restaurants, hotels, markets, offices, printing shops, auto repair shops, medical institutions, and hospitals. Nuclear reactors produce toxic, radioactive substances, such as heavy water or spent nuclear fuel. Radioactive waste is hazardous to all life forms as well as to the environment. These are the substances that have characteristics of ignitability or corrosivity or reactivity or toxicity. All waste generated from different sources can be grouped into biodegradable waste and non-biodegradable wastes. Biodegradable waste can be decomposed by the action of microorganisms. Domestic sewage, newspaper, and vegetable matter are biodegradable and under rotting. Non-biodegradable waste cannot be decomposed easily by microorganisms due to complex chemical constituents. Polythene bags, plastics, glass, aluminium cans, iron nails and DDT are some of the non-biodegradable waste materials (Aye and Widjaya, 2006).

Due to the increasing population and subsequent urbanization, production and consumption processes have increased because of which waste generation has increased rapidly in India. As a result of industrialization and the shifting of people from rural to urban areas in search of jobs, there has been an increase in the urban population, as a

result of which waste generation has also increased tremendously. Industrialization has brought both positive as well as negative impacts on the world. And, solid waste generation and its improper management is one of the negative consequences of industrialization. Unscientifically, disposal of solid waste in open dumps and landfills creates problems for public health and the environment. Hence, safe disposal with effective waste management is necessary. Waste management is concerned with how solid waste can be transformed and turned into a useful resource. Currently, India's population is around 1.50 billion, or 140 crores, which is showing an increase of 0.91 billion during 2020. As per an estimate, a total of 1,30,000 to 1,50,000 metric tonnes (MT) of municipal solid waste is being generated in India every day. That means around 330-550 grams of waste is generated per urban inhabitant per day. In this way, it adds up to roughly 50 million MT per year, and if it is calculated considering the current rates, this will increase to ~125 million MT per year by 2031 (Kumar *et al*., 2020).

As per a recently published study, around 62 million tonnes of waste are currently being generated in our country which may increase by up to 165 million tonnes by 2030 (Kumar *et al*., 2020). Of the total generated solid waste, only 75-80% of the municipal waste gets collected and only 22–28% of this waste is processed and treated. So, the rest of the waste (approx. 72–78%) is left untreated and dumped in open areas, which is leading to environmental and health hazards. Therefore, it is necessary that every household, including business owners all around the world, adopt solid waste management (Bioswas *et al*., 2017; Vinothkumar *et al*., 2021).

Waste Management Audit procedures includes the definition of Waste Management audit, methodology on how to conduct Waste Management audit at Educational Institutions and Industrial sectors as per the checklist of Environment Management Systems and International Standards on ISO 14001:2015, World Green Building Council, Swachh Bharath Scheme under Clean India Mission to understand the principles and importance of various audits in the context of the organization and risk assessment at 360˚ views (Gnanamangai *et al*., 2021). Waste Management audit helps the educational institutions/ industries to maintain eco-friendly environment, assures personal hygiene to various stakeholders and supports the nation; on the whole for the noble cause of environmental protection and nature conservation which in turn enhances the quality of life of all living beings (Arora, 2017; Demirbas, 2021).

2. Role of Educational Institutions in India

Educational institutions are playing important role in a nation's growth and development which starts from maintenance of Different wastes without harming the environment (Chan and Lam, 2018). A clean and healthy environment in an Organization determine effective learning skills and offers a conducive learning environment to the students. Educational institutions are insisted by both Central and State Governments to offer eco-friendly atmosphere to the stakeholders (Rajalakshmi *et al*., 2021). In addition, all the Educational institutions are asked to save the environment for future generations and to resolve the environmental problems (accumulating solid wastes and wastewaters/effluents and their careless disposal, enormous utility of plastics, uneconomical consumption of water, irresponsible in water

harvesting and storage procedures, etc.) through Environmental Education. Implementing Swachh Bharath Abhiyan Scheme launched by the Indian Government thro' the Educational institutions plays a major role in terms of giving neat and clean environment to tribal, rural and urban people across the country, besides the regular and conventional activities carried out by NSS, NCC/Student Force, Nature club, Eco club, Science club, Fine Arts club, Flora and Fauna club, Youth Red cross unit, etc. Seminar, Conference, Workshop, training and awareness programmes on environmental Waste Management awareness programmes may be conducted periodically by the Management and Administrative people of an Organization to the stakeholders.

Waste Management auditing is a systematic method whereby an organization's environmental performance is checked against its environmental strategies and compliances of the Government guidelines. This audit process is definitely useful for the Educational institutions to maintain the campus neatly and can give pure atmosphere to the students and staff members including management people (Vergara and Tchobanoglous, 2012). It is like an official examination of the environmental effects on an organization's campus as per the Government guidelines. The audit report may be useful to improve the organization's campus significantly by following the recommendations and suggestions given in the report. The Waste Management processes are being undertaken by ISO EMS 14001:2015 criteria and the concept of Swachh Bharath Abhiyan under Clean India Mission (Gnanamangai *et al*., 2021).

3. Waste Management and Environment Policy

Waste management and environment policy aims to provide an education and awareness in a clean environment to the stakeholders with regard to environmental compliance. Scope of the policy applies to all employees and students of the Institution/organisation to provide an ecofriendly atmosphere (Ghiani *et al*., 2014). Waste Management Policy dealt with cleanliness of the campus maintained through proper disposal of wastes and steps to be followed to recycle the biodegradable wastes and utilization of eco-friendly supplies to maintain the campus free from hazardous wastes /pollutants (Cardenas and Halman, 2016). The concept of eco-friendly culture is disseminated among the students as well as rural community through various awareness programmes. Head of the Organization, Departmental Heads and Senior Managers/ Management Representatives are responsible for monitoring the "waste management" initiatives of the College / University and maintain a clean campus while each and every individuals of the organisation should adhere to the policy.

4. Environment Friendly Campus

As stated earlier, Organization is liable to provide an eco-friendly atmosphere along with waste management facility to all the stakeholders (students and staff members). All non-compostable and single-use disposable plastic items, plastic utensils, plastic straws and stirrers should be avoided. Demonstration/awareness programme on establishing plastic-free environment and utility of organic alternatives for all incoming and current students, staff and faculty should be organised. Reduction of use of papers alternated with e-services, e-circulars, etc. and proper disposal of wastes, recycling and suitable waste management system should be considered to

establish environment friendly campus. Environment Friendly Campus is playing an important role in terms of imposing waste management scheme which in turn useful to maintain the soil health and increased productivity (Sridhar and Adeoye, 2015).

5. Importance of Waste Management Auditing

The Management of the Organization (Auditee) should be exposed their inherent commitment towards making ecofriendly atmosphere through the Waste Management and ready to encourage/follow all types of waste management activities. They should promote all kinds of waste management activities such as conduct of environment awareness programmes, usage of segregation bins, avoiding of single use plastics, utility of organic alternatives prior to and after the Waste Management (Suwartha and Sari, 2013). The administrative authorities should formulate 'Waste Management Policies' based on technical report of Waste Management auditing. A clean and healthy environment will enhance an effective teaching/learning process and creates a favourable learning clean environment to the scholars. They should create the awareness on the importance of waste management through environmental education among the student members and research scholars. Waste Management is the most effective, ecological approach to manage environmental complications.

Waste Management may be beneficial to the campus in improving the greenery activities which in turn useful to save the planet for future generation. It is necessary to conduct Waste Management audit frequently at least once in three years in campus because students and staff members should aware of the Waste Management and its beneficial effects in order to save planet by means of 'Go green concept' which in turn support the institution to set environmental models ('icon') for the community. Waste Management is a professional and useful measure for an Organization to determine how and where they are retaining the campus eco-friendly manner (Kaseva and Gupta, 1996). It can also be used to implement the alleviation measures at win-win situation for the stakeholders and the planet. It provides an opportunity to the stakeholders for the development of ownership, personal and social responsibility.

6. Broad Categories of Waste

6.1. Municipal Solid Waste (MSW): It is commonly known as garbage collected by the municipality and/or disposed of at the municipal waste disposal site. Based on the sources of waste generation, it is further categorised into residential, commercial, institutional, and municipal services. MSW include food items, packaging materials, newspapers, clothes, containers, bottles, batteries, and durable goods like furniture, etc., generated by households, offices, hotels, shops, schools, and other institutions (USEPA, 2020). Some fractions of demolition and construction debris, hazardous waste materials such as used electric light bulbs, batteries, automotive parts, and a very small quantity of biomedical waste such as discarded medicines and used syringes, are often found in collected municipal solid waste. Once collected, they are sorted and treated for recycling and reuse before their final disposal.

6.2. Biomedical waste: Biomedical waste or hospital waste is the waste created by healthcare activities such as diagnosis, treatment, immunization, or any kind of research activity or in the production or testing of biologicals. It contains hazardous materials

such as needles and syringes, chemicals, pharmaceuticals, medical devices, and radioactive materials and infectious materials such as unwanted microbiological cultures and stocks, bandages and soiled dressings, body parts, other human or animal tissue, diagnostic samples, discarded blood, etc.

6.3. Plastic waste: Plastic wastes are the discarded products made of plastic, such as packaging material, carry bags, pouches, etc. whose life is over and are of no use as prescribed in the Plastic Waste Management Rules, 2016. They are recyclable materials. It is necessary to manage plastic waste properly because the accumulation of plastic discarded objects causes adverse effects on wildlife, the marine environment, and human beings. Plastic waste can be easily seen everywhere on land and in oceans, lakes, rivers, ice, and air, which causes damage to humans and the whole environment.

6.4. Electronic waste: Electronic waste, also known as "E-waste," refers to unwanted or useless electronic or electrical products that are non-working, broken, rejected, or have reached the end of their useful life. Some examples of electronic waste are computers, cell phones, tablets, televisions, photocopiers, fax machines, etc. They are dangerous in nature due to toxic chemicals they release and can harm the environment. Although they can be refurbished, reused, or recycled.

6.5. Bio-waste: Bio-waste is biodegradable waste, which consists of mainly organic waste. It includes green waste generated from paper waste, gardens and parks, food and kitchen waste from households, restaurants, and food processing waste from food processing plants. In the landfill directives, it is defined as ‘waste capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and cardboard. Bio-waste is a fuel resource that may be used to produce heat and electricity.

6.6. Construction and demolition (C&D) waste: C&D waste comprising of building materials, construction debris and rubble generated during the redevelopment, construction, repair and demolition of any civil structure. Though it is kept as a separate category, some of the fraction of C&D waste is also found in municipal solid waste. The waste was disposed of at the disposal facilities which contains high proportion of recyclable materials, which are used to make construction materials. The C&D waste may have some hazardous substances which should be disposed of separately.

6.7. Industrial waste: Industrial waste is generated as a result of industrial processes. They are categorized mainly as hazardous waste and non-hazardous waste. Though industrial waste is not considered as municipal solid waste and is not mixed with it, in some places, non-hazardous waste is disposed of with municipal waste. In this case, the industries arrange for waste transportation to the disposal site and may be responsible for disposal fees. According to the legislation and current practises, the municipality should explicitly define its responsibility for industrial waste management. This would assist in the quantity and classification of hazardous and non-hazardous industrial wastes, as well as municipal and non-municipal wastes.

6.7. Food waste: It refers to the decrease in mass (quantitative) or nutritional value (qualitative) of food - edible parts - throughout the supply chain that was intended for human consumption. It also refers to food that gets spilled, spoilt or otherwise lost, or incurs reduction of quality and value during its process in the food supply chain before it reaches its final product stage. It is typically taking place at production, post-harvest, processing, and distribution stages in the food supply chain.

7. Scope of Waste Management Audit

Waste management audit is sought to examine whether the institution / industries / pharmaceutical / hospitals had identified waste as a risk to environment and health, accurately assessed the amount of different kinds of waste being generated in the institution/industries/pharmaceutical/hospitals and drafted a policy on waste management which focused on waste minimisation and waste reduction, as compared to waste disposal, as the more effective ways to manage waste (Rajeshwari *et al*., 2015; Trung and Kumar, 2015). In addition, the waste management audit sought to examine whether all kinds of waste had been covered under legislation for safe disposal and whether agencies had been allocated responsibility and accountability for the management of waste.

8. Benefits of the Waste Management Auditing

There are several benefits on conduct of Waste Management by the Organization which may be definitely useful to improve the campus significantly based on the audit report. The Waste Management contained methodology followed and both qualitative and quantitative measurements including physical observation of availability of adequate dust bins, usage of personnel protected materials, separate transportation trolley and method of disposal of waste. The waste management scheme is essential to impose the soil health and increased productivity in an organization (Brunner and Rechberger, 2014). The following are the major benefits of the waste management process.

- Availability of adequate number of user-friendly dust bins as per Guidelines (Red, Yellow, Blue, and Black & Green Bins) in the campus for various wastes' collection, segregation and disposal.
- Maintenance of 'Record Register' for waste disposal and puncture proof containers for sharps / blue bags in the campus.
- Availability and usage of personal protected materials like Gloves, Caps, Masks, Aprons & Gum boots etc. as per the Guidelines in the campus.
- Availability of 1% fresh Sodium hypochlorite or Bleaching Powder solution as per guidelines for maintaining the pest and disease free hygiene environment.
- Proof of Licensed companies signed MoU with the organization for wastes collection and disposal as per the Central and State Government regulation.
- Norms are being followed by the Organization as per the Central and State Government Pollution Control Board.
- Different Forms, Formats, Annual Report, etc. are available for waste collection and mode of transportation.
- Availability of a trained dedicated with skilled personals for waste management in each campus in department / sector wise.
- Checking whether e-wastes, bio (wood) wastes, construction wastes, plastic

wastes, hazardous wastes and biomedical wastes mixed at the source of generation.

- Checking whether the waste collected in covered bins and is the bins filled up to more than ¾ th level.
- Checking whether the bins are cleaned with soap and disinfectant regularly and is the stored waste kept beyond 48- 72 hrs.
- Checking whether the waste transported in closed containers or open bags and are the waste collection bins/Trolleys/wheel barrow used for transporting wastes.
- Checking whether the concept of E-Waste, Plastic Waste, Biomedical waste management is followed in the campus.
- Whether E-Waste management practices included in the purchase policy of electronic items and observe the E-waste refurbished and used again in the institution.
- Whether the importance waste and their implications on environmental and personal hygiene through awareness programmes are conducted for stakeholders.
- Signing MOU with Government and NGOs ensure proper handling of waste materials and reuse of construction and wood wastes in the same campus.

9. About the Organization

9.1 S.A. Engineering College (Autonomous)

S.A.Engineering College (Autonomous)offers the students with advantageous atmosphere with state-of-the-art facilities, distinguished mentors, and pleasant educational environment. The institution provides the employability and communication skills for the development of students. It provides quality education in an environment of discipline. The focus is on shaping students to become self-disciplined, self-dependent and self- confident individuals. SAEC pulls out all the stops to mould the students' career in such a way that they excel in all fine distinction of life. The College's stand is not only on mere acquisition of course knowledge and its application but also on all-round personality development of the student and his value system. The infrastructure facilities have also been made to allow detailed learning ambience for the students. The full-fledged eco-friendly offers a quality environment to the students.

History

Towards fulfilling the above objectives, the Dharma Naidu Educational & Charitable Trust established the S.A. Engineering College (Autonomous) in the year 1998 – '99 in accordance with the general policy of the Govt. of TamilNadu to give high priority to Technical Education. The campus is spread over a vast area of about 42 acres and has

2.25 lakh sq.ft. of constructed area which includes class rooms, drawing halls, laboratories, workshops and associated facilities. In recognition of the quality system of high caliber being implemented for the administration of the institution and achievement of its goals, m/s. TUV NORD have recorded ISO 9001: 2008 certification. The institution has NBA Accredited Departments and NAAC "A" Grade certification.

Standards

The College maintains high standards of education by providing a wide array of world- class academic facilities, employing highly qualified and experienced faculty members and creating an ambience conducive to quality education. The College offers the following 8 Undergraduate courses in Engineering, 4 Post Graduate courses in Engineering, Master of Computer Applications (M.C.A) and Master of Business Administration (M.B.A). The College is well-planned and well-designed, built with more than 4 lakh square feet of constructed area. The aesthetically designed campus has ultramodern facilities with separate academic wing for each department, administration block, laboratories and workshops, state-of-the-art computer labs, spacious classrooms, well-stocked library, conference hall, separate seminar hall for each department, canteen, dining hall with hygienic kitchen, playgrounds, and separate hostel for boys.

Vision

To transform our institution into quality technical education centre imparting updated technical knowledge with character building.

Mission

- To create an excellent teaching and learning environment for our staff and students to realize their full potential thus enabling them to contribute positively to the community.

9.2. About Nature Science Foundation (NSF)

NSF is an ISO 9001:2015, 14001:2015, 45001:2018 & 50001:2018 certified and registered with Ministry of Micro, Small and Medium Enterprise (MSME), Government of India Organization functioning energetically towards the noble cause of nature conservation and environmental protection. NSF is managed by a board of trustees of NSF Public Charitable Trust under the TN Societies registration Act 1975 (TN Act 27 of 1975) on 29th November, 2017 at Peelamedu, Coimbatore- 641 004, Tamil Nadu, India with Certificate of Registration No. 114 / 2017. In addition, NSF has 12A, 80G and Form 10AC certificates for income tax exemption and implanting various Government schemes. The main motto of the NSF is to “Save the Nature to Save the Future” and “Go Green to Save the Planet”. NSF Branch Offices are also functioning effectively at Gorakhpur, Uttar Pradesh and Faridabad, Haryana, India to adopt the ‘Go Green Concept’ in a big way. NSF family is wide spread across India with over 115 state-wise Lead auditors to conduct Green and Environment Audits.

NSF is functioning strenuously to conduct different awareness programmes and implement various schemes to public and school / college students towards the noble cause of nature protection. Some of the programmes are also being organized for the benefit of tribal communities to create the supply chain for biodiversity conservation studies. The objectives along with vision and mission are illustrated to promote educational and environmental awareness programmes through social activities for enhancing the quality of life and to conserve nature from environmental pollutants using traditional and modern technologies for sustainable land management. NSF is educating

the tribal community children through social service and towards the upliftment of tribes as a whole and make them as entrepreneurs.

International Eco Club Student Chapter (IECSC) has been established for Student volunteers and faculty members are encouraged to conduct National and International events, Student Technical Symposium, Distinguished lecture programme, Environment day celebration, Ozone day celebration, Project model exhibition, Awareness programmes on Environmental pollution, Biodiversity and Natural resources conservation and etc. with the financial support of the Foundation. NSF is being released 'Magazine' and 'Newsletter' biannually to share the information about Environmental awareness programmes on biodiversity conservation, seminar on soil conservation, water management and solid waste management, restoration and afforestation programmes in Western Ghats of southern India.

In order to encourage the students, members of faculty, academicians, scientists, entrepreneurs and industrial experts those who are involving in nature protection and biodiversity conservation studies across the world, NSF tributes the deserved meritorious candidates with various awards and honours such as 'Best Faculty Award', 'Best Women Faculty', 'Best Scientist Award', 'Best Student Award', 'Best Research Scholar Award', 'Best Social Worker Award', 'Young Scientist Award', 'Life-Time Achievement Award' and 'Fellow of NSF'. These award and honours will be given to the deserved meritorious candidates during the 'Annual Meet and Award Distribution Ceremony' which will be conducted every year during the first week of January.

NSF has introduced various types of Audits such as 'Eco Audit', 'Green Audit', 'Energy Audit', 'Hygienic Audit' Water & Soil Audit, Plastic Waste Management Audit, Biomedical Waste Audit, Solid Waste Management Audit, E-Waste Management Audit, Academic & Administrative Audits including ISO certification process to Academic Institutions, R&D Organizations and Industries towards the accreditation process as well as maintaining a hygienic eco-friendly environment to the stakeholders in their campus. All audits will be conducted as per the Checklist prepared by the NSF ISO Criteria and in compliance with Government Law and Environmental Legislations including World / Indian Green Building Council and the concept of Swachh Bharath Abhiyan under Clean India Mission. Green campus and Environment Policy, Purchase Policy, Energy Policy, MoU, International Eco Club student Chapter.

Audit processes are being conducted through the certified Auditors as per the following by the NSF

Audit	**Certified Auditors**	**Certified Auditors**
Green Audit	• IGBC - Indian Green Building Council • GBCRS - Green Building Code and Green Ratings Systems • GRIHA – Green Rating for Integrated Habitat Assessment	➢ Dr. S. Rajalakshmi ➢ Dr. R. Mary Josephine ➢ Dr. B. Mythili Gnanamangai ➢ Er. N. Shanmugapriyan

Energy Audit	• BEE - Bureau of Energy Efficiency • LEED - Leadership in Energy and Environmental Design • CII-GreenCo – GreenCo Rating System Felicitator	➢ Er. D. Dinesh kumar ➢ Er. N. Shanmugapriyan ➢ Dr. N. Balasubramaniam ➢ Dr. P. Thirumoorthi ➢ Dr. G. Murugananth
Environment Audit	• IGBC -Indian Green Building Council • ASSOCHAM - Associated Chambers of Commerce and Industry of India • FSRS – Fire Safety & Rescue Services	➢ Dr. S. Rajalakshmi ➢ Dr. A. Geetha Karthi ➢ Dr. R. Mary Josephine ➢ Dr. B. Mythili Gnanamangai ➢ Er. N. Shanmugapriyan
Hygiene Audit	• FSMS – Food Safety Management System & • Occupational Safety & Health (ISO 22000:2018) • SBICM - Swatch Bharath under India Clean Mission	➢ Mrs. Gaanaappriya Mohan ➢ Dr. R, Sudhakaran ➢ Dr. N. Saranya
Waste Management Audits	• Water & Soil Audit, Plastic Waste Management Audit, Biomedical Waste Audit, Solid Waste Management Audit, E-Waste Management Audit as per the Checklist of NSF	➢ Mrs. Gaanaappriya Mohan ➢ Dr. R, Sudhakaran ➢ Er. N. Shanmugapriyan
Academic & Administrative Audits	• Academic & Administrative Audits as per the NAAC Criteria and ISO implantation procedure • In compliance with the Environmental legislations and rules and regulations	➢ Dr. B. Anirudhan ➢ Dr. B. Shreeram ➢ Dr. R. Mary Josephine
ISO Certification	• QMS (9001:2015), EMS (14001: 2015), OHSMS (45001: 2018), ISMS (27001:2018), FSMS (22000: 2018), QMSMD (13485: 2016), EnMS (50001: 2018)	➢ Dr. S. Rajalakshmi ➢ Dr. A. Geetha Karthi ➢ Dr. K. Sreedharan

10. Audit Details

Date / Day of Audit	**:**	**27.10.2022**
Venue of Audit	**:**	**S.A. Engineering College (Autonomous), Chennai, TN**
Audited by	**:**	**Nature Science Foundation,** Coimbatore, Tamil Nadu, India.
Audit type	**:**	**Waste Management Audit**
Name of Auditing Chairman	**:**	**Dr. S. Rajalakshmi Jayaseelan,** Chairman of NSF & ISO QMS, EMS, OHSMS, EnMS Auditor.
Name of Lead WM Auditor	**:**	**Dr. B. Mythili Gnanamangai,** Vice Chairman of NSF, Indian Green Building Council Accredited Professional.
Name of ISO OHSMS Auditor	**:**	**Dr. K. Sreedharan,** Lead Auditor, ISO Occupational Health & Safety Management System (45001:2018)
Name of the Hygiene Auditor	**:**	**Dr. P. V. Sreenivasan** ISO FSMS OHS Hygiene Auditor, NSF.
Name of Subject Expert-I	**:**	**Mr. B.S.C. Naveen Kumar,** Senior Faculty, Mahatma Gandhi National Council of Rural Education, Ministry of Higher Education, Hyderabad.
Name of Subject Expert-II	**:**	**Dr. M. Ravichandran,** Lead Auditor & Associate Scientist, Bayer Bioscience, Pvt. Ltd. Hyderabad, AP.
Name of Subject Expert-III	**:**	**Er. D. Dinesh Kumar,** Certified Lead Auditor, IGBC, ASSOCHEM, GRIHA & LEED
Name of Eco & Green Officer	**:**	**Mrs. M. Priya,** Environment, Energy & Green Council Programme Officer, NSF.

11. Procedures followed in Waste Management Audit

Waste Management is a structured process of documenting the credentials in terms of availability of adequate Dust bins, usage of personnel protected materials, separate transportation trolley and method of disposal of waste. it is a kind of a professional tool for assessing the waste management in the campus. Waste Management projects the best environmental practices and initiatives taken in the organisation at the prescribed site of audit that brings added value to the organisation in maintaining the eco-friendly campus to the stakeholders. First step of the audit is ensuring that the organisation has a central role in building the waste management, in order to validate the same (Adeniji, 2018).

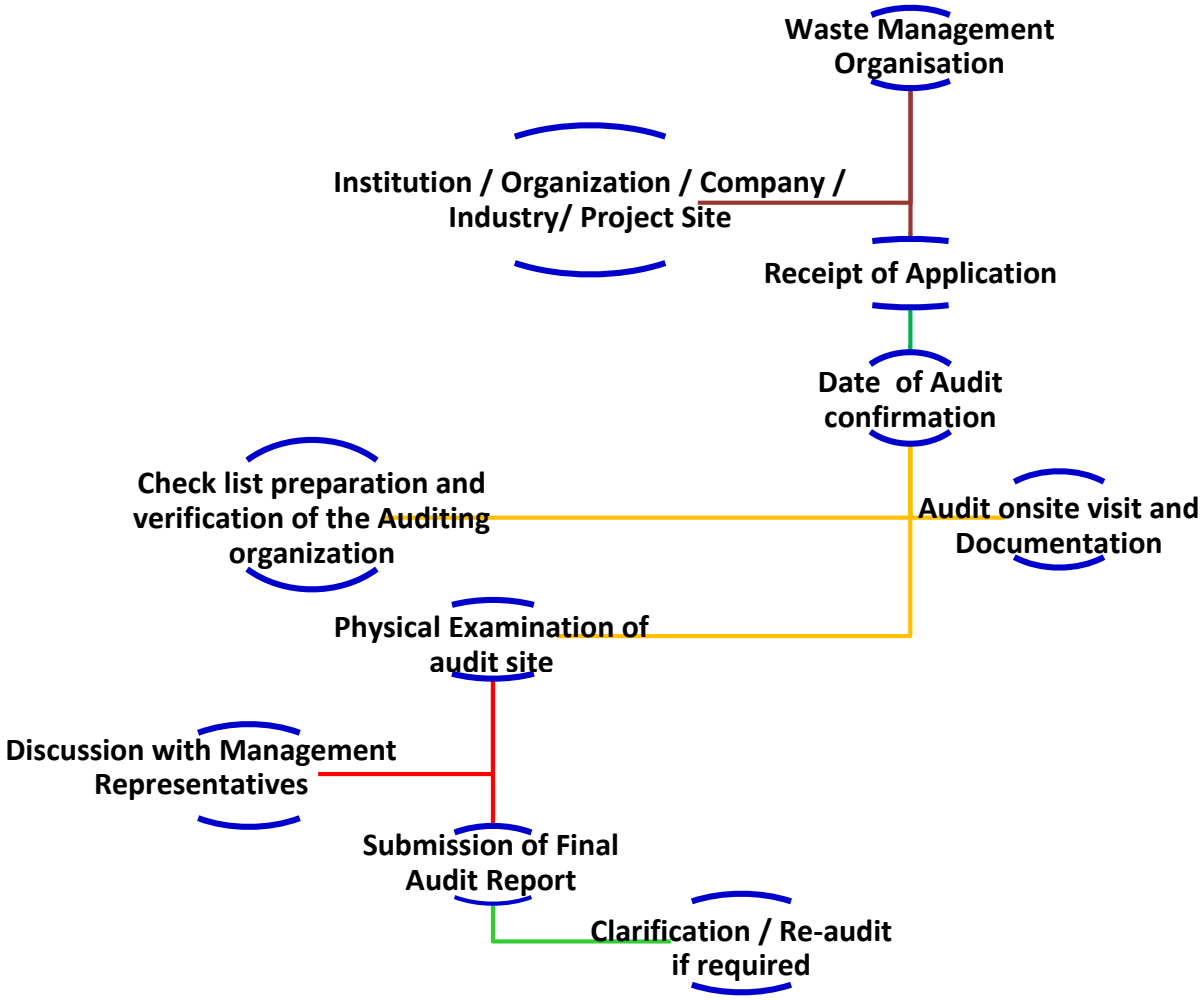
Waste management is not intended for the self-sustainability of the building alone, it also involves in propagation of the waste management initiatives so as to be adopted by any individuals and organization at a minimum cost. Waste Management has been conducted as per the checklist of Nature Science Foundation, Coimbatore, Tamil Nadu, India (www.nsfonline.org.in) through the authenticated Professionals for people qualified to investigate and evaluate the campus for validating the best environmental practices (Staniskis and Katiliute, 2016). Professional team of ISO Environment Management Audit (14001:2015), Indian Green Building Council Accredited Professionals, Experts of waste management Lead Auditors were selected to conduct the Waste Management process.

During the audit, Availability of Adequate number of Dust Bins as per Guidelines (Red, Yellow, Blue, and Black & Green Bins) in the campus for various wastes' collection, segregation and disposal, maintenance of 'Record Register' for waste disposal and puncture proof containers for Sharps / Blue Bags in the Campus, Availability and usage of personal protected materials like gloves, Caps, masks, aprons and gum boots etc. as per the guidelines of Tchobanaglous *et al*. (2007), PIB GoI (2016) and Tewari (2021) in the campus, Availability of 1% fresh Sodium hypochlorite or Bleaching Powder solution as per guidelines is checked to assess the personal and hygiene environment. Checking whether e-wastes, wood wastes, construction wastes, plastic wastes, hazardous wastes and biomedical wastes mixed at the source of generation, checking whether the waste collected in covered bins and is the bins filled up to more than ¾ th level are monitored. In addition, checking whether the bins are cleaned with soap and disinfectant regularly and is the stored waste kept beyond 48- 72 hrs, checking whether the waste transported in closed containers or open bags and are the waste collection bins/Trolleys/wheel barrow used for transporting wastes are also monitored ring the audit process. Checking whether the E-Waste refurbished and used again in the institution are also done during the audit process as per the protocol of Gnanamangai *et al*. (2021).

Projects, Dissertations and Thesis are the academic effort credentials that always fosters the innovative ideas on thinking and implementation of new innovative approaches towards the waste management. These should be disseminated through presentations and publications in social media, books, magazines and journals so as to spread the innovative ideas and methods to the broad public. These efforts taken by the students and staff members were deliberated while conducting the waste management. Waste management processes are taking place as per the following flow-chart starting from the receipt of application forms from the auditee (organization) and ending upon the submission of final report to the concerned organization (Leal Filho *et al*., 2015). During the audit process, the best environmental practices followed and new initiatives undertaken in the organisation to reduce the environmental pollution and steps taken for nature conservation that brings added value to the organisation in maintaining the eco-friendly campus with respect to waste management process were assessed (WGBC, 2021). In addition, supporting activities of the scholars and staff with regard to "Vision and Mission" of the waste management activities of the Organization is also evaluated.

11.1. Onsite Waste Management Audit activities

Opening meeting is the first step between the audit team and auditee along the Management Representatives where the purpose of the audit, procedures to be adopted for the conduct of the audit, verification of the documents and the time schedules were discussed, in brief. Followed by opening meeting, onsite inspection will be conducted which is the second step in the audit where the Audit team members visited different sites in the campus and required photographs were taken then and there for preparing the audit report. During the onsite phase of visit, it is vivid how the various facilities made by the S.A. Engineering College (Autonomous) Management to the stakeholders to ensure the waste management in the campus. It is observed how the environment is protected in the campus and by what means an eco-friendly atmosphere is being given to the stakeholders. The assessment reveals the strengths and weaknesses of the Auditee's Management controls and risks associated with their failure in creating waste management facilities. Collecting audit proofs *ie*, data collection and information from the auditee as per the audit protocol were carried out. An exit meeting was conducted to describe the findings of the audit with Management Representatives and staff members along with the audit team in brief.



Flow-chart of Waste Management Audit Procedures

11.2. Pre-Audit stage activities

A pre-audit meeting (opening meeting) is conducted with Management and Administrative people along with staff coordinators of waste management audit process, wherein, audit protocol and audit plan were discussed in brief. The purpose of this meeting is to provide a chance to emphasize the scope and objectives of the audit and discussions held on the feasibilities associated with the audit (Marrone *et al*., 2018). Pre-audit stage activities are an essential prerequisite for the Waste Management to meet the auditee and to gather information about the campus and required documents were collected directly from the Organization before the start of the audit processes (Fachrudin *et al*., 2019). Audit team was selected by the Nature Science Foundation as per the checklist comprised of Lead Auditor of ISO (EMS 14001:2015), Environmental and CII certified Waste management sustainability professional from Conventional and Technical Universities, agencies, certifying bodies across India and Accredited Professionals from World Green Building Council.

Opening meeting with the Principal, Management Representatives, IQAC Coordinator, Staff members of S.A. Engineering College (Autonomous), Chennai and Audit Team of the Nature Science Foundation, Coimbatore, TN.

11.3. Target Areas of Waste Management Auditing

Waste Management is nothing but a professional tool to assess the waste management activities in the educational institutions and give a value addition to the campus and considered as a resource management process. Waste management process may be undertaken at frequent intervals and their results can demonstrate improvement or change over time. Eco-campus focuses on the reduction of carbon emissions, water consumption, wastes to landfill and enhance energy use conservation to integrate environmental considerations into all contracts and services considered to have significant environmental impacts (Choy and Karudan, 2016). There are several target listed in the waste management process in which a few are taken into consideration as per the Indian scenario is concerned. They are the various sources (source of plastics, wood, e-waste, biomedical, construction and demolition waste and hazardous waste), segregation of waste, storage area of the waste, collection and transport units, processing units and the landfills.

12. Impact of Waste on Health and Environment

Waste represents a threat to the environment and human health if not handled or disposed of properly. Surface and ground water contamination takes place when waste reach water bodies. Residues from waste can change the water chemistry, which can affect all levels of an ecosystem. The health of animals and humans are affected when they drink the contaminated water. A specific environmental hazard caused by waste is leachate, which is the liquid that forms, as water trickles through contaminated areas leaching out the chemicals. Movement of leachate from landfills, effluent treating plants and waste disposal sites may result in hazardous substances entering surface water, ground water or soil. Waste contaminates soil and can harm plants when they take up contaminants from their roots. Eating plants or animals that have accumulated soil contaminants can adversely affect the health of humans and animals. Emissions from incinerators or other waste burning devices and landfills can cause air contamination. Incinerators routinely emit dioxins, furans and polychlorinated by-phenyls, which are deadly toxins, causing cancer and endocrine system damage. Landfills are a big source of release of greenhouse gases, which are generated when organic waste decomposes

in landfills. E-waste contains a mix of toxic substances such as lead and cadmium in circuit boards; lead oxide and cadmium in monitor cathode ray tubes; mercury in switches and flat screen monitors; cadmium in computer batteries; polyvinyl chloride in cable insulation that release highly toxic dioxins and furans when burned to retrieve copper from the wires. Thus, improper handling of waste has consequences both on the environment as well as on the health of the people.

13. Management of Wastes

Waste management can be simply defined as the collection, transport, recovery and disposal of waste together with monitoring and regulation of the waste management process. Waste prevention means measures aiming at the reduction of the quantity and harmfulness for the environment of diverse waste streams. Prevention is the most desirable waste management option as it eliminates the need for handling, transporting, recycling or disposal of waste. It provides the highest level of environmental protection by optimising the use of resources and by removing a potential source of pollution. The most popular types of waste management are Recycling, Incineration, Landfill, Biological Reprocessing and Animal feed. According to United Nations Environment Programme (UNEP), waste management includes both the components of prevention and disposal of waste. Rather than regarding 'waste' as a homogenous mass that should be buried, they argued that it was made up of different materials that should be treated differently i.e. some should not be produced, some should be reused, some recycled or composted, some should be burnt and others buried. According to this hierarchy, the priority of any country should be to extract the maximum practical benefits from products and prevent and minimize the waste that is generated. Thus, strategies for waste disposal should focus on waste prevention and minimization through 7R's - Recycle, refuse, Reduce, Reuse, Repair, Re-gift and Recover.

Incineration is the disposal of waste materials by means of burning. The power produced by burning waste materials to produce heat, energy or steam. One of the drawbacks of this disposal process is that it can be a source of air pollution. Landfills includes the collection, transportation, disposal and burying of waste in designated property. Landfill sites are a significant cause of health and environmental problems that concern many communities. The gas from theses landfills is often incredibly dangerous. Chemical waste materials, such as kitchen waste and paper goods, can be reused after a procedure called biological reprocessing which is another popular system amongst the varied types of waste management. Multiple physiological systems, including recycling and biomass gasification, are used in biological reprocessing. Composting is a normal biological mechanism that is carried out under control conditions. One of the ends of the stock is natural gas, which is used to produce heat and electricity. Biological reprocessing is commonly used for the disposal of industrial waste. Food waste can be preserved by manure and livestock feed and this is also one of the ecological types of waste management methods.

The three types of waste management based on the nature are (i) Solid Waste Management, (2) Liquid Waste Management and (3) Biomedical Waste Management. The term solid waste refers to all discarded and thrown away solid and semi-solid wastes arising from human and animal activities. These may be classified as municipal wastes, industrial waste, and hazardous waste. The use and throw culture of advanced societies has led to a tremendous increase in the generation of solid waste. To overcome the major causes of solid waste, we have to practice the rules of no littering zone, separate the dry waste and wet waste and dump it into the municipal vans, avoid usage of plastic, etc. liquid waste management is the practice followed to remove or prevent the discharge of pollutants to the drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid materials.

To overcome the problem of liquid waste, we should stop dumping the oil containers on the ships, which disturb marine life, stop washing animals across the rivers, etc. Process of treating Liquid Waste by the Management includes (i) Primary treatment: Screening, grit removal, and sedimentation (settling), (ii) Secondary or biological treatment: Biological processes and additional settling and (iii) Tertiary or advanced treatment: Not all sewage treatment plant requires tertiary (advanced) treatment. Biological wastes are generated during the diagnosis, testing, treatment, research, or production of biological products for humans or animals. Major sources of biomedical waste are hospitals, blood banks, labs, etc. Process of treating Biomedical Waste Management includes (i) Incineration, (ii) Autoclaves, (iii) Mechanical / Chemical Disinfection, (iv) Microwave, (v) Irradiation and (vi) Vitrification. Waste management involves a process whereby wastes are collected, transported, and disposed of in the best possible way of limiting or eliminating the harmful effect of wastes. This aspect of environmental management is as important as other public amenities or infrastructures without which the life of a contemporary man would be extremely difficult.

14. Observations of Waste Management

During the waste management audit processes, how the organization is managing the various waste materials like e-wastes, wood wastes, construction wastes,

plastic wastes, hazardous wastes and biomedical wastes in the campus effectively without harming the environment. It is ensured that a proper storage of the wastes as per their classification, characterization, mode of treatment and disposal and analysis of disposal and recycling process of wastes as per the guidelines of MOEF, CPCB & DPCC are carried out.

14.1. Qualitative Measurements of Waste Management

S.No.	Requirements and checklists of the audit	Conformity		
		Yes	No	NA
1.	Adequate number of Dust Bins as per Guidelines (Red, Yellow, Blue, and Black & Green Bins) are made available in the campus for various wastes, collection, segregation and disposal.	√		
2.	Record Register for waste disposal and Puncture proof Containers for Sharps / Blue Bags are made available in the campus	√		
3.	Mutilators (Needle / syringe cutters) and calibrated weighing machines for biomedical wastes collection*		√	
4.	Personal protected materials like Gloves, Caps, Masks, Aprons & Gum boots etc. used are adequately made available as per the Guidelines in the campus.	√		
5.	Around 1% fresh Sodium hypochlorite or Bleaching Powder solution is made available as per guidelines*			√
6.	Mercury Spill Management, kit, Post Exposure Prophylaxis Kit and Blood spill Management kit are available*			√
7.	Proof of Licensed Companies signed MoU with the Organization for wastes collection as per the Govt. regulation	√		
8.	Norms are being followed by the Organization as per the Central and State Government Pollution Control Board	√		
9.	Different Forms, Formats, Annual Report, etc. are available for waste collection and mode of transportation	√		
10.	Availability of a trained dedicated with skilled personals for waste management.	√		
11.	Is the waste segregated at the site of generation? If not, where are they segregated?		√	
12.	Is the infectious waste and non infectious waste mixed at the source of generation?*			√
13.	Is e-wastes, wood wastes, construction wastes, plastic wastes, hazardous wastes and biomedical wastes mixed at the source of generation?			√
14.	Is the waste covered in covered bins? and Is the bins filled up to more than ¾ th level ?	√		

15.	Is the bins cleaned with soap and disinfectant regularly and bins are overfilled? And is the stored waste kept beyond 48-72 hrs?*			√
16.	Is the waste transported in closed containers or open bags? and Are the waste collection bins/Trolleys/wheel barrow used for transporting wastes?	√		
17.	Is the personal protective gears like mask and gloves used while collecting the wastes from the site of deposition?	√		
18.	Whether the concept of E-Waste management is followed in the campus?	√		
19.	Has a Management Representative, E-Waste Specialist, Laboratory Staff been assigned?	√		
20.	Whether E-Waste management practices included in the purchase policy of electronic items?	√		
21.	Whether an authorised refurbrisher appointed to manage the E-waste	√		
22.	Are the E-Waste refurbished and used again in the Institution?		√	
23.	Whether the importance waste and their implications on environmental and personal hygiene through awareness programmes are conducted for stakeholders?	√		
24.	Signing MOU with Government and NGOs ensure proper handling of waste materials	√		
25.	Whether construction and wood wastes are subjected to reuse them in the same organization campus?	√		
26.	Whether plastic wastes are burnt inside the campus? Any air pollution due to plastic materials burning takes place ?		√	
27.	Projects and dissertation works, scholarly publication on various wastes and their management carried out by staff members and students	√		
28.	Whether hazardous wastes are properly discarded in which acids, solvents and salts are disposed after diluting with water and poured after buried in the soil	√		
29.	Have programmes for the achievement of plastic free area objectives and targets been established and implemented as on today? Any display board is made in the campus?	√		
30.	Are recycling of plastic polymers promoted in the campus among the stakeholders?	√		
31.	Wood waste are collected and recycled properly and they used for fuel and degradation / green manuring purposes?	√		
32.	Residual wastes are properly disposed in the campus after burring the soil with proper dilution with water	√		

* Applicable for Hospitals/Labs/Pharmaceutical Industrial sectors

14.2. Plastic Waste Management

Plastics fuelled scientific and technological innovations due to their flexibility, durability, water resistance, and affordability. The most extensively used techniques of plastic waste management across the globe are mechanical recycling, incineration and landfilling. Recycling of plastic is considered as environmental friendly and the most effective way of plastic waste management. The other method of plastic waste management is incineration. The non recyclable plastic waste irrespective of segregation, cross contamination, additives and impurities are burned through incinerators. Landfilling is another method of plastic waste management. But unsanitary landfill or dumping of waste leads to tremendous space constraints, leaching of harmful chemicals and can also result in open surface fire in dumps, often resulting in the release of harmful air pollutants like dioxins and furans. Waste management audit conducted at S.A. Engineering College (Autonomous) is ensured the methodology adopted to reduce the use of plastics among the stakeholders. The institute is collecting plastic items periodically and subjected to proper segregation into recyclable and non-recyclable wastes in appropriate colour coded and labelled bins. After segregation of plastic wastes, they are given to the Tamil Nadu Municipal Corporation for its further disposal and recycling processes as per the Central and State Government policies. The College Campus has taken sufficient attempts not to use single use plastics in the campus and 'say no to plastics' in places like canteen, hostel dining halls, seminar halls, corridors, etc. to the students, parents and public. The Management insisted the people use eco-friendly bags made from organic materials like plant fibres which are easily decomposable in nature. These efforts are very much essential to keep the environment neat and clean to conserve nature.

14.3. Construction and Demolition (C&D) Waste Management

The waste comprising of building materials, bris and rubble resulting from construction, re-modelling, repair and demolition of any civil structure. According to Technology Information, Forecasting and Assessment Council's (TIFAC), highest waste generation comes from demolition and construction of buildings. The typical composition of Indian C&D wastes are concrete, soil, sand, gravel, bricks, wood, asphalt and metal. Recycling of C&D wastes is important as it helps to reduce the dependence on natural resources and eliminates adverse environmental impacts. Recycling of C&D wastes has the additional advantage of controlling the quantum of C&D wastes destined for disposal at landfills besides reducing transportation costs. The list of reuse and salvage materials include appliances, bathroom fixtures, bricks, blocks, masonry stone, structural steel, cabinets, carpeting, ceiling tiles, timber and timber based boards, door and window frames and shutters, flooring tiles, stone tiles/platforms, insulation, landscaping materials, lighting fixtures, metal framing including for partitions and ceiling, panelling, pipes, antique mouldings, accessories and hardware of furniture, PVC water tanks, roofing sheets used for garages, outdoor areas, fabric of

tensile structures etc. Waste management audit conducted at the Campus is ensured the C&D wastes properly reused in the campus. C&D waste management activities such as segregation, reuse and recycling are properly done without harming the environment. The College has performed the estimation of the amount and type of recyclable and non-recyclable waste materials that are expected to be generated on site. Listed all expected quantities of each type of waste and recycled into aggregates which are effectively used in the construction of pillars and pathways.

Segregation of Construction Waste observed at SAEC, Chennai, TN

14.4. Bio wastes Management

Bio wastes are originated from plants animals and food wastes which also affect the environment to a greater extend. Depending on the biowastes quality, it can be recycled or reused for energy production. Plant wastes can be reused as a building material, recycled into mulch for landscaping, pulp for paper production, and used as a fuel. The rising cost of waste material disposal and a growing environmental consciousness also contribute to the increasing importance of waste wood recycling. The reason for recycling waste wood is world approaching closer to global warming and reduce their global footprints. S.A Engineering Campus (Autonomous) is at the initial to collect the various biowastes across the campus and recycle them properly without harming the environment. Recycles biowastes are reused for plant cultivation as manuring.

Segregation of Waste at the source of generation by using different coloured dustbin observed inside the SAEC Campus, Chennai, Tamil Nadu.

14.5. Hazardous Wastes

Hazardous-waste management, the collection, treatment, and disposal of waste material that, when improperly handled, can cause substantial harm to human health and safety or to the environment. Hazardous wastes can take the form of solids, liquids, sludges, or contained gases, and they are generated primarily by chemical production, manufacturing, and other industrial activities. They may cause damage during inadequate storage, transportation, treatment, or disposal operations. Improper hazardous-waste storage or disposal frequently contaminates surface water and groundwater supplies as harmful water pollution and can also be a source of dangerous land pollution.

SAEC Campus, has taken pioneering efforts to dispose the hazardous waste properly that are generated from various Department laboratories. The Campus did not dispose the chemical wastes in regular trash or in the drainage system. Acids, solvents, salts, reagents and cancer-causing substances (carcinogens) will cause cancer to the stakeholders those who doing research and/or experiments. Acids and Reagents are carefully mixed with 2 to 5 gallons of water and diluted solution poured slowly down the sink followed by flushing with large quantum of water without splashes. Most chemical wastes must be disposed of safely without affecting the environment, soil health and water quality as per the directions of World Hazardous Waste Programme. The Management has a certain protocol to dispose waste as well as expiry chemicals properly. But there are some proper records for disposing of acids, reagents, carcinogenic and hazardous chemicals as per the rule of Central and State Pollution Control Board. The usage of chemicals has been recorded very low inside the campus.

14.6. Electronic Waste

Electronic waste, as known as e-waste, is generated when any electronic or electrical equipment becomes unfit for the intended use or if it has crossed its expiry date. E-waste posses the huge risk to humans, animals, and the environment. E-waste typically consists of plastics, metals, cathode ray tubes (CRTs), printed cables, circuit boards, and so on. The presence of toxic substances like liquid crystal, lithium, mercury, nickel, selenium, polychlorinated biphenyls (PCBs), arsenic, barium, brominates flame retardants, cadmium, chrome, cobalt, copper, and lead makes it very hazardous, in case e-waste get dismantled and processed in a crude manner with the rudimentary techniques. The computers, mainframes, servers, monitors, printers, scanners, compact discs (CDs), copiers, calculators, battery cells, cellular phones, fax machines, transceivers, TVs, medical apparatus, iPods, refrigerators, washing machines, and air conditioners are examples of e-waste when they become unfit for its use. If these electronic items are discarded with other household garbage, the toxics pose a threat to both health and vital components of the ecosystem.

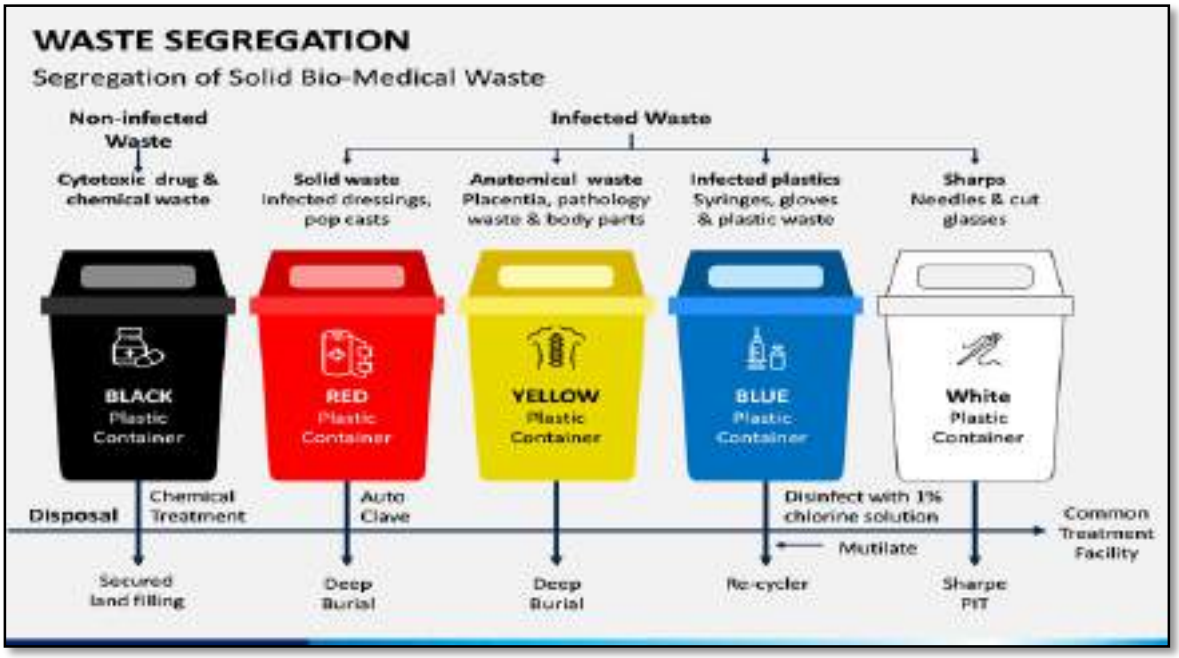
According to E-Waste Management Rules, 2016 (Ministry of Environment, Forest and Climate Change, Government of India), electronic waste or e-waste includes old and non-functional electrical and electronic appliances. As per the Rules, the producer of the electrical and electronic equipment shall be responsible to collect and channelize the e-wastes generated under the criteria Extended Producer Responsibility. In compliance to the E-Waste Management Rules, 2016, Government of India, e-waste materials were collected from the S.A. Engineering College (Autonomous) campus are being segregated and then sold to Authorised Agencies which are approved by the Pollution Control Board (PCB) for handling e-waste. Segregation of e-waste helps in proper management of e-wastes are segregated from other waste and collected in red coloured bin. Due to this e-waste activity disposal, the e-waste pollution is significantly reduced in the Campus.

Segregation of E – Waste observed at SAEC, Chennai, TN.

14.7. Biomedical Wastes Management

Biomedical waste comprises of all liquid and solid wastes generated from medical establishments and activities involving biological materials. Besides health care, the relevant activities include clinical research, research involving animals, animal farms, dead animals, and others. The generation of biomedical waste is not restricted to specific activity or organisations. It can originate from homes during dialysis and using insulin injections, animal health activities in rural areas, butchering of sick animals in butcher houses, medical shops, use of sanitary napkins and ear buds, use of diapers, and air ports when passengers through away restricted medicines without prescription. Negligence in biomedical waste management contributes to environmental pollution, sickness of humans/animals, and depletes natural as well as financial resources.

Typical biomedical waste management steps are includes (1) segregation into various components, (2) waste handling and storage, (3) transportation, (3) treatment and disposal. Rural areas and areas where service of common biomedical waste treatment and disposal facility (CBMWTDF) are not available Health Care Establishments (HCE) shall dispose through captive facility to avoid spreading of infection and toxicity. A location for storage of biomedical waste should be earmarked inside the establishment generating such waste. Biomedical waste, in bags/containers, should be stored in a separate room, place or building of a size suitable to the quantities of waste generated. Colour coding basically exists to allow to easily distinguish the different types of biomedical waste, by sorting them into different categories, each pertaining to a single colour. Unless a cold storage room is available, healthcare waste should not exceed 48 h during the winter and 24 h during the summer in warm climate regions, 72 h in cool season and 48 h in hot season in regions with temperate climate.



Counselling Centre and Hygienic maintenance at SAEC, Chennai, TN

14.8. Solid Waste Management

The term, solid waste control refers to the method of accumulating and treating solid wastes by following eco- friendly methods. It also offers solutions for recycling objects that do not belong to garbage. In the solid waste management, the wastes are accrued from different parts and are disposed of based on degradability materials like paper and non-degradability materials like glasses, plastics and metals. Integrated Solid Waste Management (ISWM) is an activity that promotes reduction of waste, recycling, composting, and disposal besides offering methods/solution to manage stable wastes in the context of protect all living organisms in the ecosystem. As per Solid Waste Management Rules, 2016 (Ministry of Environment, Forest and Climate Change, Government of India), solid waste refers to solid or semi-solid wastes generated from domestic, commercial, institutional, catering, and markets and other non-residential wastes (street sweepings, silt removed or collected from surface drains, horticulture/agriculture and dairy waste, bio-medical waste excluding industrial waste, and e-waste, battery/radio-active waste). According to the rules, the local authorities are responsible to collect, treat and dispose the solid wastes. The 'Central Board of Solid Waste Management' is the monitoring authority and is responsible for granting authorization to local bodies for processing and disposal of solid waste.

Table 1. Wastes Management Strategies in is SAEC, Chennai, TN

S.No	Kinds of Wastes	Collection (kg/year)	Collection frequency	Name of the Agency
1.	Plastic wastes	100-200	Monthly	Tamil Nadu Municipal Corporation
2.	Construction and demolition wastes	Quantity is not known	Weekly	Utilized by the Campus premises itself
3.	Biowastes	300-500	Daily	Recycled in the Campus premises itself as manuring
4.	E-wastes	100-200	Yearly	Tamil Nadu Municipal Corporation
5.	Biomedical wastes	2-5	Need based	Biomedical Waste Corp. Ltd.,
6.	Hazardous wastes	Quantity is not known	Weekly	Tamil Nadu Municipal Corporation

The Campus has a very good solid waste recycling unit which operates a few vehicles to collect wastes using compostable bags across the campus. Both degradable and non-degradable items are being collected from different Department laboratories, canteens, cafeteria, stationary shops and hostels every day and dumped in the place which is subsequently segregated based on the nature of degradability. The segregated items are neatly packed in eco-friendly covers and subjected to degradation without harming the environment. In addition, dust bins are kept in different places across the campus to provide a dust free atmosphere to the stakeholders. The dust bins are labelled properly for the indication of degradable and non-degradable items. These bio composts are utilized for cultivation of plants in the campus and enhance the health of soils and population density of beneficial microorganisms to a greater extend.

14.9. Biogas plant facility

A biogas plant is the structure where it is produced by fermenting biomass (cow dung and plant waste products). This is done by developing methane-containing fuel that is usually present in energy crops like corn, or waste substances (manure or organic food waste). The fermentation residue left over from the substrates at the end of fermentation can be used as fertilizer. Biogas is produced by the microbial/bacterial decomposition of the substrate under anaerobic situations. This is implemented by pumping the substrate into the fermenters. The substrate is stored beneath anaerobic conditions and is periodically shifted *via* agitators to avoid the formation of surface scum and sinking layers which allows the biogas to rise greater effortlessly. Installing biogas in educational institutions and industries help in the waste management process, as the wastes accumulated in canteen, hostels, mess and restaurants can be used for biogas plant, which in turn can be used for cooking. This fulfils two purposes simultaneously by energy saving and waste management. The Campus is in the initial development process for setting up biogas plant in the campus.

Biogas Plant Facility at SAEC, Chennai, TN.

14.10. Vermicompost, Organic and Green manures

Natural or eco-friendly methods should be used to grow plants vigorously in the campus which could reduce the environmental pollution. Use of biofertilizers, organic manures (cow dung, vermicompost and plant wastes and litters) and green manures to grow healthy plants in the medicinal plant garden, kitchen garden and terrace garden should be ensured to keep the campus organic. The plant waste such as fallen leaves, stems, fruits, nuts, seeds and other plant parts should be used to make green manures. A concrete or ground level green manure production unit and vermicomposting units will help to convert all the plant and animal-based wastes into green/organic manures. This will be a healthy way of solid litter waste management in the campus. Minimal use of chemical fertilizers as part of integrated nutrient management system is acceptable but nil use of chemical fertilizers is highly appreciable and also helps to keep the campus more of an organic ecosystem. The soil, air, water and sunlight are the four major natural resources any campus gets. Proper use and conservation of these resources are mandatory in Waste Management sites. Biofertilizers such as Nitrogen fixing bacteria, Potassium and Phosphorus solubilizing bacteria, Potassium mobilizing fungi (VAM), farmyard manure, dried cow dung manure, vermicompost manures and biofungicides and biopesticides are extensively used in Campus to cultivate plants. Agrochemicals, chemical fertilizers, pesticides and fungicides are not used. These practices are very well appreciated because air, water and soil pollution due to use of agrochemicals is eradicated which in turn to improve the soil health significantly. The College is at the initial stage of Composting system

14.11. Napkin disposal facility

Menstrual Hygiene Management (MHM) is an indispensable part of the Swachh Bharath Mission Guidelines (SBM-G) for adolescent girls and ladies. As in step with

MHM hints, ‘Safe disposal’ method making sure that the process of destruction of used and dirty materials is performed without human touch and with minimum environmental pollutants and ‘Unsafe disposal’ method throwing used material into ponds, rivers, or inside the fields exposes others inside the vicinity to decaying material and must be averted. Some of the unsafe practices of napkins include throwing them unwrapped into fields and rooftops, wrapping them in paper/ plastic bags and throwing them outdoors or in dustbins, burying them for de-composting, throwing them in latrine / toilets, burning it. These unsafe practices are to be avoided and rather health practices can be adopted. The Campus Management is implementing the safe practices of disposing of napkins using small scale incinerators in ladies’ hostels. Incinerator’s facility and disposal structures in the proper directions and other social stigmas connected to menstruation influences the sanitary waste disposal conduct of women within the campus is very much appreciated. The Management is taking care of adolescent girls and ladies significantly in their personal hygiene.

14.12. Environmental Education on Waste Management

An environmental study is the learning principle of the ecosystem and how it will expand sustainable techniques to defend the surroundings. It enables people to develop an understanding of the environment in which we live and helps to overcome tough environmental troubles affecting nature. In addition, the physical aspects of the environment should be studied, it also emphasizes the need to conserve biodiversity and undertake an extra sustainable way of life and make use of sources in a responsible manner. To create attention amongst today’s generation on pressing environmental troubles, the University Grants Commission (UGC) in India has made it mandatory for the Universities and Autonomous Colleges to introduce a course in ‘Environmental studies’ and teach to the students about the ecosystem, pollution and problems associated with the environment. Environmental education refers to structured efforts to deliver how natural environments function, how human beings can manage to protect the ecosystems in sustained manner. It is a multi-disciplinary field integrating Biology (Botany and Zoology), Chemistry, Physics, Ecology, Environmental Science & Engineering, Earth Science, Atmospheric Science, Mathematics, and Geography. These subjects may be useful to convey the importance of ecosystem, ecology and environment to the students and scholars.

15. Action Plan and Suggestions for Waste Reduction in the Organization

Preparing one’s own waste reduction action plan allows one to rethink procedures to produce less waste or redesign processes and hence boost efficiency. There are eight steps to be taken by the Organization as per the following:

Step 1: Review the site waste audit report and ensure 3R’s actions to be followed

Review site Waste Audit Report and gather information about the 3R’s actions that are currently in place, such as waste reduction strategies, quantity of current waste Reduction, Reuse, Recycling, and analysis of operating costs after following 3R’s.

Step 2: Using the 3Rs, identify major waste reduction opportunities

Examining the materials that make up a substantial part of the waste produced is a key aspect in identifying 3R's potential for waste reduction. Consider the cost of waste disposal, the potential for source separation, the potential to reduce, reuse, or recycle, the complexity of handling, and current and potential regulatory requirements.

Step 3: Determine waste reduction after identifying potential areas

Possible impacts of other priorities on the 3R's should be investigated when developing a waste reduction action plan in which review the costs and benefits of each waste reduction opportunity. Be aware of anticipated landfill closures, increased tipping fees, or other factors that may affect the disposal of waste and ensure the availability of on-site storage space and storage space with adequate fire safety should be considered.

Step 4: Figure out why waste is produced?

When evaluating waste reduction possibilities, the Organization should start by asking, "Why is this material being used?". It may reveal the possibilities for reducing, reusing, or recycling the waste significantly. There are some questions such as 1) where waste can be eliminated during the operations by reducing the use of specific materials or procedures, 2) where other materials that can be reused or recycled can be used, 3) where it is possible to utilise disposable materials and 4) where can we put controls in place to limit waste production during the operations?

Step 5: Evaluate impact of material purchasing practices on waste reduction

Material purchasing procedures involve a lot of waste reduction possibilities. Actions to change the materials used to manufacture the products or provide very good services which may involve discussions with suppliers. Replacing non-recyclable materials with reusable or recyclable materials gives economic benefits and greater waste diversion.

Step 6: Achievable waste reduction action plan

A waste reduction action plan is a compilation of the identified waste reduction opportunities and the actions intended to be taken in reducing waste. At this stage, realistic waste reduction targets should be set. Excessive over-targeting could have negative effects on employee attitudes and confidence in future work plans. The work plan focuses on the wastes for which reduction measures, actions and objectives have been specified. The format enables us to identify activities on specific waste materials as well as the total amount of waste reduced, reused, and recycled.

Step 7: Identify the waste reduction, reuse, and recycling opportunities

The following are some opportunities to improve the management of waste products:

a) Reduce Waste

Employees at campus facility may already be employing a variety of waste-reduction techniques. Some disposable products may have already been replaced with reusable products in the facility. Use fewer disposable supplies and equipment that we use. Focus on strengthening purchasing rules in administrative departments to reduce the amount of incoming packaging.

b) Minimize Paper Usage

Avoiding the waste of paper by implementing double-sided printing and photocopies. E-mail memos and reports to staff or clients instead of providing hard copies. Encourage staff to save digital copies of documents instead of printing them. Remove names from mailing lists if magazines or catalogues are no longer needed.

c) Bulk Purchasing

To get volume discounts, look into buying in bulk. Bulk purchases frequently come with less packaging than items purchased individually.

d) Disposable / Reusable / Eco-friendly Packaging

Request loose products rather than individually packed ones when purchasing supplies. Instead of using disposable tape dispensers, use permanent tape dispensers. Request that the package be "taken back" by the vendor or it should be reusable or eco-friendly.

e) Cafeteria Waste

Single-serve condiment containers should be avoided. Customers that bring their own coffee/travel mug should receive a discount. To cut down on waste, go over the menus again, focusing on portion sizes. Start a "litter less lunch" campaign to encourage employee or students to bring lunches in reusable containers. Napkin dispensers might help to avoid using too many napkins.

f) Washrooms

Replace disposable hand towel dispensers with hand dryers where possible.

g) Manufacturing Technology

Where possible, adopt newer production technologies that reduce material usage. Due to older technology, make sure that process start-up and/or cut-off tolerances aren't exorbitant. To avoid waste, improve process controls.

h) Reuse Equipment

Reusable things can be donated or sold. The organisations are typically interested in equipment and supplies that are no longer needed.

i) Donate Left Over or Unused Food

Donations of consumable fresh foods and out-of-date packaged foods are welcomed by many food banks. To determine if it can assist in this way, contact the local social organisations.

j) Recycle Waste

Many recyclable materials, such as corrugated cardboard, office paper, newspaper, glass, aluminium, steel, plastic products, and food waste, have markets. As the markets grow, more items may be added to the recycling list.

k) Use of Recyclable Materials

Look for ways to include recycled materials in products development. The success of recycling is dependent on stable material markets. It can also contribute to the environment by buying products containing recycled materials.

l) Internal Recycling

Recycle the own products' materials. Where feasible, introduce processes to support internal recycling of waste materials.

m) Employee Training on Source Separation

Make sure that the segregation in different types of waste materials at source of origination. All personnel should be trained in source-separation techniques and given enough well-labelled containers and storage facilities to collect recyclable material.

n) Organic and Inorganic Wastes

Examine the options for composting and look into composting organic materials like food waste, leaves and yard trash, and paper towels with private operators or the local Government sectors.

o) Internet or Business Directory

Find recycling companies in the Organization campus area by using a local business directory or by doing a search on the internet.

Follow 3Rs: Reduce , Reuse and Recycle
Reduce • Buy less and use less. • Purchase recycled papers. • Use softcopy instead of hard copy • Purchase environmentally friendly office supplies. • Choose to purchase items with less packaging. • Double-side printing and photocopying. • Use one-sided printed paper instead of throwing in trash. • Set printer to print double sided as a default setting. • Print notices on half-sheets. • Use emails instead of faxes. • Post newsletters online. • Avoid printing out emails. • Host paper-free meetings by setting the agenda on the board. • Use fewer paper towels in the washroom or replace them with electric hand dryer. • Use refillable soap dispenser in washroom • Encourage waste-free lunches. • Reduce the use of tetra-packs by using refillable containers. • In the dining area replace the paper napkins with the cloth napkins.

- Purchase condiments, sweeteners, salt, and pepper in bulk.
- Use dispensers instead of individually packaged servings.

Reuse

- Replace disposable items with reusable items and learn to share or donate to avoid the landfill.
- Reuse the other side of used paper.
- Use reusable coffee cups and water bottles.
- Stock cafeteria with reusable or biodegradable plates, cups, and cutlery.
- Donate uneaten lunch items to a "share a lunch" program.
- Donate used computers, eyeglasses, cell phones, clothes, textbooks, and other items.
- Host a clothing swap/sale/collection.
- Host a schoolyard/garage sale-type fundraiser.

Recycle

- Divert garbage by recycling items such as paper, glass, plastics, cans, tetra packs, and cardboard.
- Recycle special items such as batteries, electronics, cell phones, and computers.
- Compost organic waste.
- Limit contamination of recycled items by ensuring they are clean.
- Recycle ink and toner products.
- Ensure correct disposal methods are used for chemicals.

Step 8: Recommendations for Sustainable Waste Management

- A proper step may be taken to minimize the environmental degradation by means of developing 'Sanitation and hygiene policy', 'Waste management policy', 'Green campus and Environment policy', 'Energy policy' and 'Purchase policy' in collaboration with Governmental and Non-Governmental Organizations.
- Helpline numbers for waste collection may be made available in the Campus which may be useful for door-to-door collection of wastes thus avoiding improper disposal by individuals.
- The concept of eco-friendly culture and sensitize the students to minimize the use of plastics, non-biodegradable materials and exploitation of natural resources which pose the environmental hazards may be carried out.
- Waste disposal management for both dry and wet wastes should be proper in which from collection to disposal of the waste, together with monitoring and regulation of the same may be undertaken. Attempts may be made to segregate the wastes and to convert organic wastes into fertilizing material through recycling and composting processes which may be used for vegetation purpose.

- Students may be taken to some industrial areas including the waste management sites to teach about the recycling of wastewaters, solid wastes, natural ecosystem, pollution-free environment and environmental education.

16. Best Practices on Waste Management Initiatives followed in the Organization

1. The Campus has taken green and environmental protection initiatives in a substantial manner by means of creating solid waste management, wastewater treatment, sanitation, and natural vegetation in the campus without harming the environment.
2. Various kinds of degradable and non-degradable wastes such as plastics, construction & demolition, biowastes, hazardous, electronic, biomedical, solid & liquid wastes, organic & inorganic wastes are segregated properly and subjected recycle and/or given to Tamil Nadu Municipal Corporation for their further processing.
3. The Management is also taking efforts in establishing vermicompost, organic and green manures facilities, identification of waste reduction reuse, and recycling opportunities, origination of wastes, use of disposable / reusable / eco-friendly packaging materials in the campus in a big way.
4. The Organization is created massive facilities for solid waste management and wastewater treatment to purify the wastewaters to manage both solid wastes and wastewaters effectively without harming the environment.
5. The dust bins and eco-friendly trashes are kept in different places across the campus to provide a dust free atmosphere to the stakeholders which are labelled properly for the indication of degradable and non-degradable items.
6. The management has created a very good campus ecosystem for making a coexisting and sustainable environment which includes natural and planted vegetation supporting a rich biodiversity of flora and fauna.
7. 'Eco Club' and 'Nature Club' along with NCC / NSS Units are functioning well and conducting a large number of awareness programmes related to nature conservation and environmental protection.
8. Swachh Bharath Abhiyan and National service schemes are implemented effectively towards sanitation, solid waste management and refining drinking water quality to promote cleanliness to rural and tribal people across the city.

17. Conclusion

S.A. Engineering College (Autonomous) (Autonomous), Chennai, Tamil Nadu is a well-established Institute in India in terms of academic and social activities. The Management is taking enormous efforts continuously in providing an eco-friendly atmosphere to the students, research scholars, parents and staff members. It is observed that the green and environmental protection initiatives are substantial by means of

creating solid waste management, wastewater treatment, sanitation, and natural vegetation in the campus without harming the environment. Various kinds of degradable and non-degradable wastes such as plastics, construction & demolition, biowastes, hazardous, electronic, biomedical, solid & liquid wastes, organic & inorganic wastes are segregated properly and subjected recycle and/or given to Tamil Nadu Municipal Corporation for their further processing. The Management is also taking efforts in establishing vermicompost, organic and green manures facilities, identification of waste reduction reuse, and recycling opportunities, origination of wastes, use of disposable / reusable / eco-friendly packaging materials in the campus in a big way. The College has 'solid waste management and wastewater treatment facility to recycle the solid wastes and wastewaters; respectively. The campus ecosystem is supported a rich biodiversity of flora and fauna which is making a sustainable environment and eco-friendly campus due to effective waste management implantation policy. Waste management audit is carried out to provide an indication on how the environmental organization system is working towards the noble cause of environmental protection and nature conservation. To conclude the waste management audit report, the College is an eco-friendly campus and providing very good amicable atmosphere to the stakeholders.

18. Acknowledgement

Nature Science Foundation, Coimbatore, Tamil Nadu, India is grateful to the Principal and IQAC coordinator of the S.A. Engineering College (Autonomous) (Autonomous), for providing necessary facilities and co-operation extends during the conduct of 'Waste Management audit'. This helped us in making the audit a magnificent success. Further, we hope that waste management audit report may be highly useful to maintain the pollution free campus which will be helpful for future generations.

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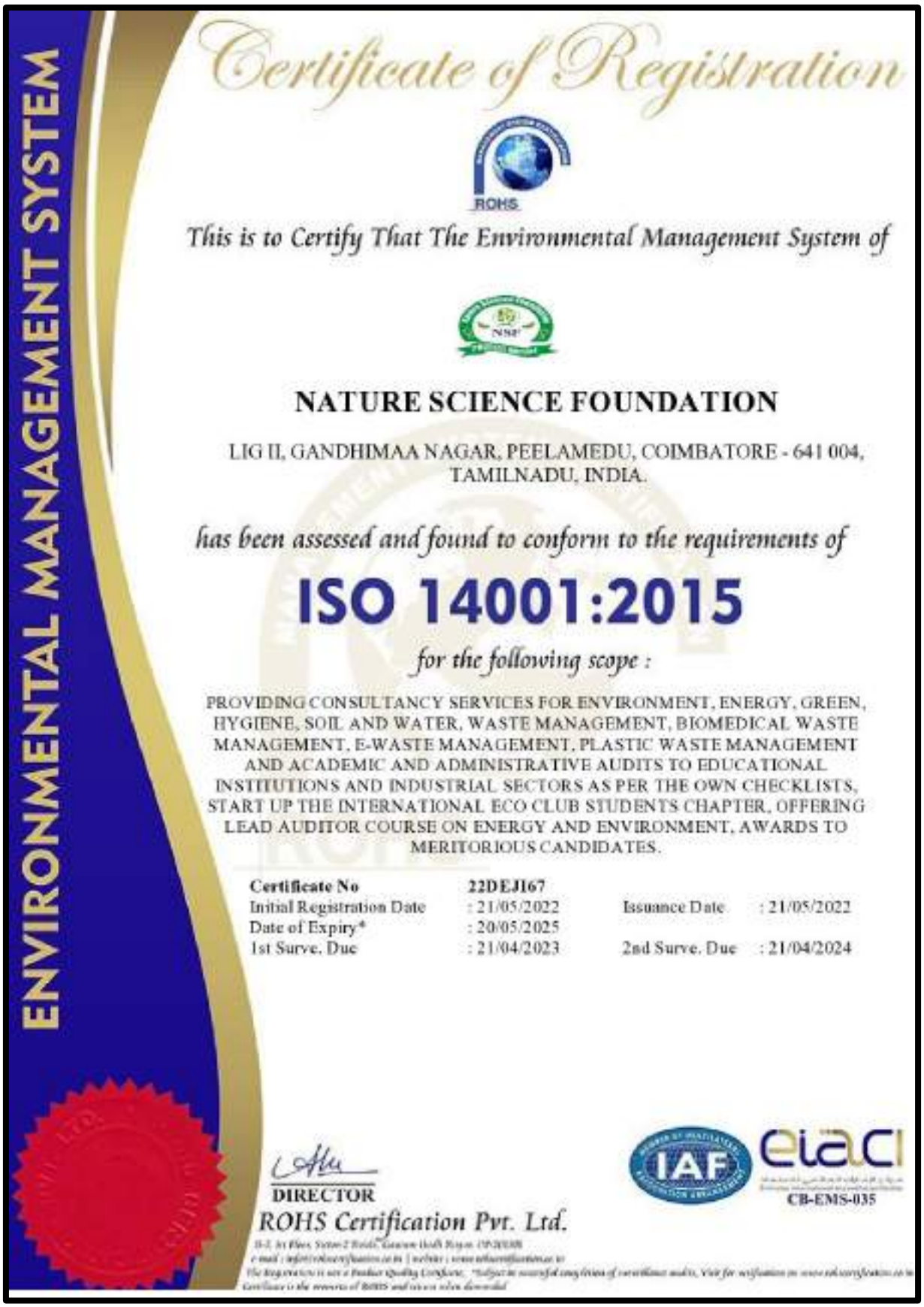

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SOCIAL CATEGORY OF ENTREPRENEUR	GENERAL

NAME OF UNIT(S)

S.No.	Name of Unit(s)
1	Green Campus, Energy and Environment Management Audits

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Village/Town	Gandhimaanagar S.O	Block	LIG-II
Road/Street/Lane	Peelamedu	City	Coimbatore South
State	TAMIL NADU	District	COIMBATORE , Pin 641004
Mobile	9566777255	Email:	chairmannsf@gmail.com

DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE	28/11/2017
DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS	12/03/2020

NATIONAL INDUSTRY CLASSIFICATION CODE(S)

SNo.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	69 - Legal and accounting activities	6920 - Accounting, bookkeeping and auditing activities; tax consultancy	69201 - Accounting, bookkeeping and auditing activities	Services
2	85 - Education	8542 - Cultural education	85420 - Cultural education	Services
3	85 - Education	8549 - Other education n.e.c.	85499 - Other educational services n.e.c.	Services

DATE OF UDYAM REGISTRATION	26/02/2022

* In case of graduation (upward/reverse) of status of an enterprise, the benefit of the Government Schemes will be availed as per the provisions of Notification No. S.O. 2119(E) dated 26.06.2020 issued by the M/o MSME.

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PROCEEDINGS OF THE COMMISSIONER OF INCOMETAX (EXEMPTIONS),
III FLOOR, ANNEXE BLDG, NO.121, MAHATMA GANDHI SALAI, CHENNAI-34

Present : G.M.DOSS, I.R.S
Commissioner of Income Tax (Exemptions)

** URNo. AACTN7857J/05/18-19/T-1105 Dated:03/09/2018

Sub: Registration u/s. 12AA of the Income tax Act 1961 - in the case of

"Nature Science Foundation"
LIG-II, 2669, Gandhimaa Nagar, Peelamedu, Coimbatore – 641 004.

Ref : Application in form 10 A filed on 28/03/2018

ORDER UNDER SECTION 12AA OF THE INCOME TAX ACT 1961.

1. The above **Trust/~~Society~~/~~Association~~/ ~~Company~~/ ~~others~~/**, bearing PAN AACTN7857J was constituted by **Trust Deed / ~~Memorandum of Association~~** dated 29/11/2017 registered with **Sub-Registrar's Office/ ~~Registrar of Societies~~**/~~Registrar of Companies~~/~~others~~ on 29/11/2017.

2. ~~The Trust Deed / Memorandum of Association has subsequently been amended / modified / altered by a Codicil / Supplementary Deed / Amendment Deed / Alteration in Memorandum of Association/others dated XX/XX duly registered on XX/XX.~~

3. The above TRUST filed an application seeking Registration u/s 12 AA of the Income tax Act, 1961.

4. On going through the objects of the TRUST and its proposed activities as enumerated in the **Trust Deed / ~~Memorandum of Association~~**, I am satisfied about the genuineness of the TRUST as on date.

5. The application has been entered at Sl.No.1105 maintained in this office. The above Trust is accordingly registered as a PUBLIC CHARITABLE TRUST u/s 12 AA of the Income Tax Act, 1961 with effect from 29/11/2017.

6. It is hereby clarified that the Registration so given to the **Trust/Institution** is not absolute. Subsequently, if it is found that the activities of the **Trust/Institution** are not genuine or are not being carried out in accordance with the objects and clauses of the **Trust Deed / ~~Memorandum of Association~~** submitted at the time of registration or modified with the approval of the **Commissioner of Income-tax (Exemptions), Chennai** or there is a violation of the provisions of Section – 13, **the** Registration so granted shall be cancelled as provided u/s 12 AA (3) or 12AA(4) of the Income Tax Act. Further, this approval is also subject to the **Trust/Society/Association/Company/ Others/** complying to the provisions of the proviso to sec 2(15) of the Income Tax Act 1961.

7. **Granting of Registration u/s 12AA** does not confer any automatic exemption of income from taxation. The **Trust/Institution** should conform to the parameters laid down in Sections 11, 12, 13 and 115 BBC of the I.T. Act, 1961, to claim exemption of its income on year to year basis before the Assessing Officer.

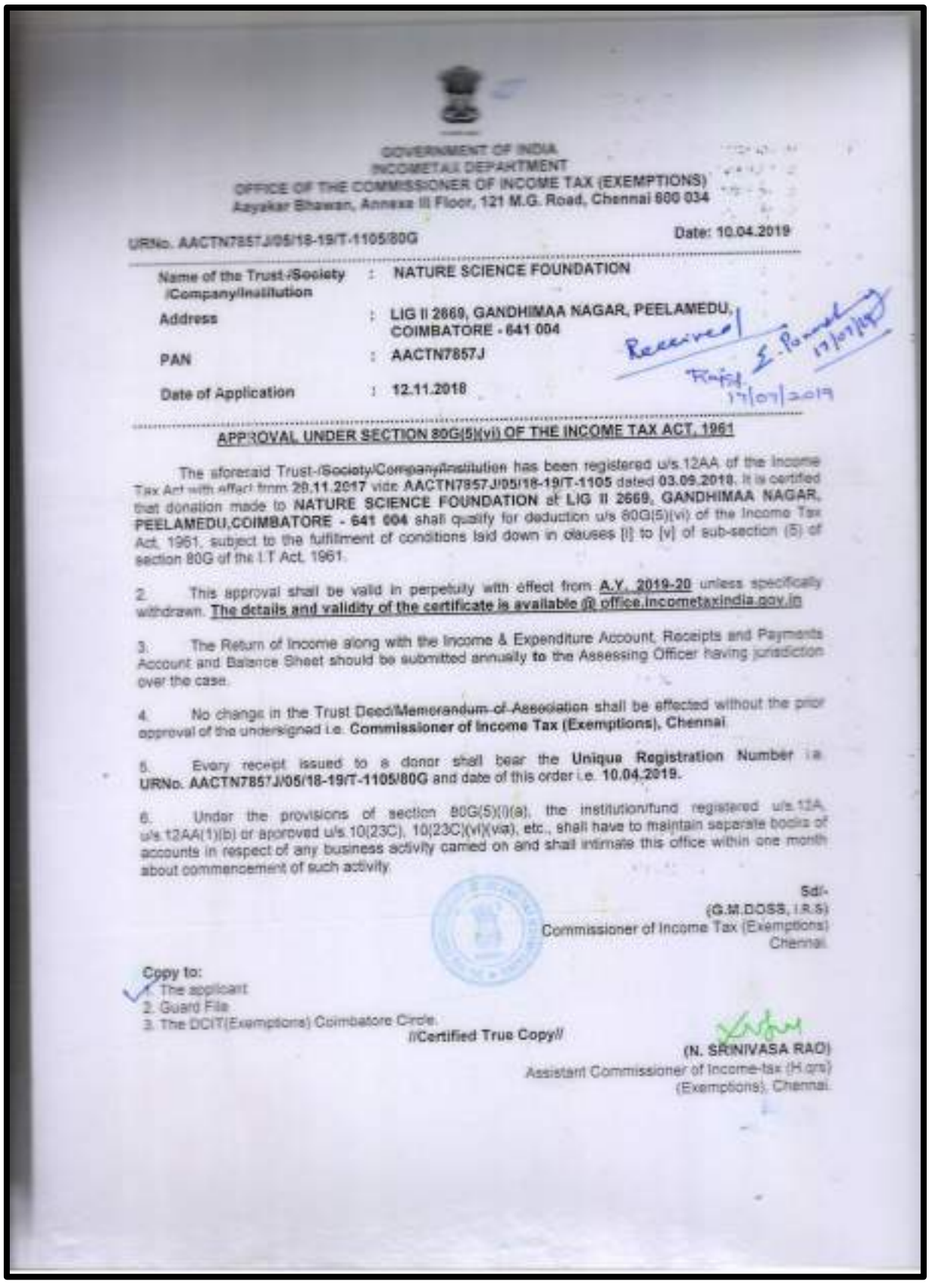
** This Unique **Registration No. URNo.** AACTN7857J/05/18-19/T-1105 **Should be mentioned in all your future correspondence.**

Sd/-
(G.M.DOSS, I.R.S)
Commissioner of Income-tax(Exemptions), Chennai.

Copy to:
1. **The Assessee.**
2. **The ACIT(Exemptions), Coimbatore Circle.**
3. **Office Copy.**

//CERTIFIED TRUE COPY//

(N SRINIVASA RAO)
Asst. Commissioner of Income-tax (H.Qrs)(Exemptions), Chennai.



GOVERNMENT OF INDIA
INCOMETAX DEPARTMENT
OFFICE OF THE COMMISSIONER OF INCOME TAX (EXEMPTIONS)
Aayakar Bhawan, Annexe III Floor, 121 M.G. Road, Chennai 600 034

URNo. AACTN7857J/05/18-19/T-1105/80G Date: 10.04.2019

Name of the Trust /Society /Company/Institution	:	NATURE SCIENCE FOUNDATION
Address	:	LIG II 2669, GANDHIMAA NAGAR, PEELAMEDU, COIMBATORE - 641 004
PAN	:	AACTN7857J
Date of Application	:	12.11.2018

Received / Regd. E-Proceedings 17/07/2019

APPROVAL UNDER SECTION 80G(5)(vi) OF THE INCOME TAX ACT, 1961

The aforesaid Trust-/Society/Company/Institution has been registered u/s.12AA of the Income Tax Act with effect from 29.11.2017 vide AACTN7857J/05/18-19/T-1105 dated 03.09.2018. It is certified that donation made to NATURE SCIENCE FOUNDATION at LIG II 2669, GANDHIMAA NAGAR, PEELAMEDU,COIMBATORE - 641 004 shall qualify for deduction u/s 80G(5)(vi) of the Income Tax Act, 1961, subject to the fulfilment of conditions laid down in clauses [i] to [v] of sub-section (5) of section 80G of the I.T Act, 1961.

2. This approval shall be valid in perpetuity with effect from A.Y. 2019-20 unless specifically withdrawn. The details and validity of the certificate is available @ office.incometaxindia.gov.in

3. The Return of Income along with the Income & Expenditure Account, Receipts and Payments Account and Balance Sheet should be submitted annually to the Assessing Officer having jurisdiction over the case.

4. No change in the Trust Deed/Memorandum of Association shall be effected without the prior approval of the undersigned i.e. Commissioner of Income Tax (Exemptions), Chennai.

5. Every receipt issued to a donor shall bear the Unique Registration Number i.e. URNo. AACTN7857J/05/18-19/T-1105/80G and date of this order i.e. 10.04.2019.

6. Under the provisions of section 80G(5)(i)(a), the institution/fund registered u/s.12A, u/s.12AA(1)(b) or approved u/s.10(23C), 10(23C)(vi)(via), etc., shall have to maintain separate books of accounts in respect of any business activity carried on and shall intimate this office within one month about commencement of such activity.

Sd/-
(G.M.DOSS, I.R.S)
Commissioner of Income Tax (Exemptions)
Chennai.

Copy to:
1. The applicant
2. Guard File
3. The DCIT(Exemptions) Coimbatore Circle.

//Certified True Copy//

(N. SRINIVASA RAO)
Assistant Commissioner of Income-tax (Hqrs)
(Exemptions), Chennai.

FORM NO. 10AC

(See rule 17A/11AA/2C)

Order for registration

1	PAN	AACTN7857J
2	Name	NATURE SCIENCE FOUNDATION
2a	Address	
	Flat/Door/Building	LIG-II, 2669
	Name of premises/Building/Village	GANDHIMAA NAGAR
	Road/Street/Post Office	Coimbatore South
	Area/Locality	COIMBATORE
	Town/City/District	Gandhimaanagar S.O
	State	Tamil Nadu
	Country	INDIA
	Pin Code/Zip Code	641004
3	Document Identification Number	AACTN7857JE2021501
4	Application Number	739995830271021
5	Unique Registration Number	AACTN7857JE20215
6	Section/sub-section/clause/sub-clause/proviso in which registration is being granted	01-Sub clause (i) of clause (ac) of sub -section (1) of section 12A
7	Date of registration	03-11-2021
8	Assessment year or years for which the trust or institution is registered	From AY 2022-23 to AY 2026-2027
9	Order for registration:	
	a. After considering the application of the applicant and the material available on record, the applicant is hereby granted registration with effect from the assessment year mentioned at serial no 8 above subject to the conditions mentioned in row number 10.	
	b. The taxability, or otherwise, of the income of the applicant would be separately considered as per the provisions of the Income Tax Act, 1961.	
	c. This order is liable to be withdrawn by the prescribed authority if it is subsequently found that the activities of the applicant are not genuine or if they are not carried out in accordance with all or any of the conditions subject to which it is granted, if it is found that the applicant has obtained the registration by fraud or misrepresentation of facts or it is found that the assessee has violated any condition prescribed in the Income Tax Act, 1961.	
10	Conditions subject to which registration is being granted	
	The registration is granted subject to the following conditions:-	

	o. This certificate cannot be used as a basis for claiming non-deduction of tax at source in respect of investments etc. relating to the Trust/ Institution.	
	p. All the Public Money so received including for Corpus or any contribution shall be routed through a Bank Account whose number shall be communicated to Office of the Jurisdictional Commissioner of Income Tax.	
	q. The applicant shall comply with the provisions of the Income Tax Act, 1961 read with the Income Tax Rules, 1962.	
	r. The registration and the Unique registration number has been instantly granted and if, at any point of time, it is noticed that form for registration has not been duly filled in by not providing, fully or partly, or by providing false or incorrect information or documents required to be provided under sub-rule (1) or (2) of rule 17A or by not complying with the requirements of sub- rule (3) or (4) of the said rule, the registration and Unique Registration Number (URN), shall be cancelled and the registration and URN shall be deemed to have never been granted or issued.	
	Name and Designation of the Registration Granting Authority	Principal Commissioner of Income Tax/ Commissioner of Income Tax (Digitally signed)

Digitally signed by SIBICHEN K MATHEW
Date: 2021.11.03 15:52:36 IST

Certificates of Waste Management Auditors

1. ISO Environment Management System (14001:2015) of Dr. S. Rajalakshmi, Chairman of NSF.
2. ISO Environment Management System (14001:2015 TUV NORD) of Dr. A. Geethakarthi, NSF Environment Auditor.
3. ISO Occupational Health and Safety, Management Systems Auditing (45001:2018) of Dr. K. Sreedharan, Lead Auditor of NSF
4. Indian Green Building Council (IGBC AP) Accredited Professional and Associated Chambers of Commerce and Industry of India (ASSOCHAM) of Dr. B. Mythili Gnanamangai, Vice-Chairman of NSF.
5. Botanist and Subject Expert of Plant Taxonomy of Dr. D. Vinoth kumar, Joint Director of NSF.
6. Bureau of Energy Efficiency (BEE) and National Productivity Council of Er. N. Dinesh kumar and Dr. N. Balasubramanian, Certified Energy Auditors of NSF.

Exemplar Global

Certificate of Training

TNV hereby certifies that

S. Rajalakshmi

has successfully completed the 5 days

Auditor / Lead Auditor Training Course which meets the training requirements of the Exemplar Global and has been declared as competent in the following competency units

- EM: Environmental Management System
- AU: Management Systems Auditing
- TL: Leading Management Systems Audit Teams

ISO 14001:2015

Issue Date: 17th Jun. 2021
Training Date : 20th to 24th May. 2021
Certificate Number : 2106170721010105

Authorised Signatory
(Pragyesh Singh)

This course is certified by Exemplar Global vide registration number TN00

Note: The course conforms to the principles and practices of Quality Management Systems for compliance with standards. This certificate remains the property of TNV and this certificate is recognized by Exemplar Global. For verification of this certificate, please write to Mail: info@isoindia

TÜV NORD

PR315: ISO 14001:2015 Lead Auditor (Environmental Management Systems) Training course

Certificate of Achievement

Geethakarthi Alagarsamy

has successfully completed the above mentioned course and examination.

23rd - 27th March 2019

COIMBATORE, INDIA

Certificate No. 35242817 02

Delegate No. 171136

for TÜV NORD CERT GmbH

Essen, 2019-04-26

The course is certified by CQI and IRCA (Certification No. 18125). The learner meets the training requirements for those seeking certification under the IRCA EMS Auditor certification scheme.

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.com

CQI | IRCA

CERTIFIED COURSE

NATIONAL PRODUCTIVITY COUNCIL

Certificate of Achievement

Is conferred upon

SREEDHARAN .K

on successfully completing process required for Internal Auditor

In the E-training

" INTERNAL AUDITING BASED ON ISO 45001
OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM"

Conducted during 9th to 11th June ,2021

Regional Director
National Productivity Council , Bhubaneswar, India

NPCBBSR/W66/9-11/6/2021/1

IGBC

Confederation of Indian Industry

The Indian Green Building Council

hereby certifies that

B Mythili Gnanamangai

has successfully demonstrated knowledge on the Green Building Design & Construction, Building Standards & Codes, IGBC Resources & Processes and Green Design Strategies & their Impacts, required to be awarded the title of

IGBC Accredited Professional

K S Venkatagiri
Executive Director
CII-Godrej GBC

V Suresh
Chairman
Indian Green Building Council

Gurmit Singh Arora
Vice-Chairman
Indian Green Building Council

210122

17 April 2021

ASSOCHAM

GEM Certificate

ASSOCHAM hereby certifies that

Dr. B. Mythili Gnanamangai

has successfully passed the

Green and Eco-friendly Movement Certified Professional Test (GEM CP)

with

"Excellent Performance"

on

16 July, 2021

He/she is now eligible to execute the GEM Sustainability Certification Projects.
ASSOCHAM feels proud to award the GEM Certified Professional title to him/her.

Pankaj R. Dharkar
Chairman, GEM

GEM CP 20/649

Deepak Sood
Secretary General, ASSOCHAM

Medicinal Plants Farmes 1999-2000

Kuppayee Thottam, Vadugampalayam Privu,

Gobi.

ATTENDANCE CERTIFICATE
FOR INSITUTIONAL TRAINING

This is to Certify that Mr D. VINOTHKUMAR

of B.Sc., BOTANY FINAL YEAR of

Chikkaiah Naicker College, Erode-4. Has undergone institutional training in Plantation,Cultivation and Collection of medicinal plants for 14 days from 18.12.99 to 31.12.99 at Gobi.

M.R. SARVANAN SCIENTIFIC PARK GOBI HERBAL

Station : GOBI

Date : 31.12.99

SIGNATURE OF THE CONCERNED AUTHORITY
M. R. SARVANAN, GOBI

BUREAU OF ENERGY EFFICIENCY

Examination Registration No. : EA-14056 Serial Number. 9176

Certificate Registration No. : 9176

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. Dinesh Kumar D Son/Daughter of Mr./Mrs. R M Dhanasekaran who has passed the National Examination for certification of energy manager held in the month of October 2011 is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number 9176 being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. Dinesh Kumar D is deemed to have qualified for appointment or designation as energy manager under clause (/) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this 7th day of February, 2013

Digitally Signed: RAKESH KUMAR RAI
Sun Mar 01 10:58:55 IST 2020
Secretary, BEE New Delhi

Secretary
Bureau of Energy Efficiency
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
22.12.2019			

Regn. No. EA-7391

Certificate No. 5093

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. N.Balasubramaniam

son / daughter of Mr. M.Nanjukuttigounder

has passed the National Certification Examination for Energy Auditors held in December - 2009, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 11th February 2010

Controller of Examination