



Submitted to
Anjuman-I-Islam's
INSTITUTE OF HOSPITALITY MANAGEMENT (AIHM)



ENVIRONMENT AUDIT REPORT

2022-2023

PREPARED BY
QUALITY CARE ALLIANCE

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Anjuman-I-Islam's
INSTITUTE OF HOSPITALITY MANAGEMENT (AIIHM)
92, Dr. D.N. Road, Opp. CSMT, Mumbai - 400001
MAHARASHTRA, INDIA



Prepared by

QUALITY CARE ALLIANCE

(ISO 9001 / ISO 14001 / ISO 45001 / ISO 50001 Certified)

Office no. 37/1, 1st Floor, Dharmveer Complex, Naupada, Thane –
400602.MH.

qualitycare.in@gmail.com | www.isocertifications.co.in



ENERGY



AIR QUALITY



WATER



WASTE

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INTRODUCTION – Environment

INTRODUCTION

Environment (Eco) audit is quantitative and qualitative data to track air, soil and water waste, and to gain actionable insights to improve the operational performance in the atmosphere. This audit is generally used to observe the clean and green environment of an Organization. It provides a 360° view of a surrounding campus and makes it easy for Owners / Managers / Environmentalists to collaborate, measure, control, and reduce environmental impacts. Finally, it leads to enhancing the quality of life for human beings, animals and plants. Eco audit initiatives are the need of the hour across the world due to change in environmental conditions, global warming and increasing human population (Maltby, 1995; Haahkim and Yunus, 2017). It aims to make a sustainable and friendly environment for the stakeholders.



Environment audit is a well-developed process of extracting information about an Organization that provides a realistic assessment of how the Organizations take steps towards protecting the environment. In order to save the eco-friendly atmosphere of an Organization, well-developed environmental objectives and targets should be undertaken to reduce the harmful effects to a greater extent. The audit process can minimize the environmental pollution in the campus remarkably which in turn reduces the global warming that affects as a whole. As per the Government law, the environmental legislations should be followed by all the Institutions and Organizations and make sure that their activities should not destroy the environment (Ramachandra and Bachamanda, 2007). An environmental audit is a kind of assessment supposed to create awareness of environmental compliance and implementation gaps in the management system, along with related corrective movements.

This audit is a systematic, documented, periodic and objective review by a regulated entity of facility operations and practices related to meeting the environmental requirements. Environment audit should be undertaken by observing, measuring, recording the data and collecting and analyzing the various components in an Organization related to the environment. To be effective, it must be done systematically and thoroughly together with full management support (Conde and Sanchez, 2017). In general, environmental audit is designed to achieve a maximum resource optimization and improved process performance in the audit sites. It is a 'Common Sense Approach' to identify the problems and solve those problems pertaining to curb eco-friendly

atmosphere (APHA, 1981; Venkataraman, 2009). Environmental audit enables a comprehensive look at the audit sites to facilitate our understanding of material flows and to focus our attention on areas where waste reduction is executed and therefore cost saving is made possible (Gowri and Harikrishnan, 2014).

Environmental audits ensure that the environment is not disturbed from its balanced existence, so that it provides an eco-friendly atmosphere to the stakeholders. Environmental audit provides vivid dimensions on how waste materials are being managed and the source of wastes along with the solutions for environmental degradation is managed. Environmental Management System (ISO EMS 14001:2015) should be implemented by every Organization to ensure that the eco-friendly campus is being given to the stakeholders. Eco-friendly youth programs, green campus practices, social responsibility and Institutional values comprehending the relationship with the ecosystem for a sustainable environment are being evaluated (IGBC, 2021).

Environmental auditing has a critical role to play in ensuring that organizations fulfil their policy commitments to environmental management and performance. Audits can provide key information to senior management on areas of risk, and progress towards objectives and targets. This audit is to determine that how well the environmental management systems and equipment are performing. To verify compliance with the relevant national, local or other laws and regulations and to minimize the human exposure to risks from environmental, health and safety problems.

The purpose of the environmental audit is to provide an indication to the management of the improvements while environmental organization system & equipment are performing. To fulfil this purpose it is essential that audits should be seen as the responsibility of the company. The audit work can be voluntary and for the advantage of the company. The audit work can be done systematically and efficiently by the help of environmental auditing programme. It helps in the proper utilization of natural resources as a whole it improves environmental quality.

Environmental auditing is used to
Investigate
Understand
Identify

These are used to help improve existing human activities, with the aim of reducing the adverse effects of these activities on the environment. . An environmental auditor will study an organization's environmental effects in a systematic and documented manner and will produce an environmental audit report. Environmental auditing is often used as a generic term covering a variety

of management practices used to evaluate an organization's environmental performance.

Environmental organization management systems and equipment are performing with the aims of:

Facilitating management control of environmental practices.

Assessing compliance with company policies.

Facilitating professional competence

ROLE OF EDUCATIONAL INSTITUTIONS IN INDIA

In view of offering eco-friendly atmosphere to the stakeholders, Educational institutions are playing an important role which starts from establishing and maintenance of eco-friendly campus without harming the environment. A clean and healthy environment in an Organization determines effective learning and provides a conducive learning environment to the students. Educational institutions are asked both Central and State Governments to give eco-friendly atmosphere to the stakeholders. In addition, all the Educational institutions are asked to save the environment for future generations and to solve the environmental problems such as recycling of solid wastes and wastewaters, minimizing plastics usage, napkin disposal, water consumption, water storage mechanisms, etc. through Environmental Education. Implementing Swachh Bharath Abhiyan Scheme launched by the Indian Government plays a major role in terms of giving neat and clean environment besides, regularly organizing Seminars, Conferences, Workshops, training and awareness programmes on environment to its students and stakeholders.

In Environment auditing environmental performance is checked against its environmental policies and compliances of the Government guidelines. This audit process is definitely useful for the Educational Institutions to maintain the eco-friendly campus in a sustainable manner and can give eco-friendly atmosphere to the students and staff members including Management people, parents, alumni and visitors. The audit report may be useful to improve the organization's campus significantly by following the recommendations and suggestions given in the report. There are some minor differences between Green campus auditing and Environment auditing with respect to natural and planted vegetation in the campus and carbon footprint in which carbon dioxide level is assessed in the campus in using the number of vehicles, electrical energy utilization efficiency and human population (Woo and Choi, 2013).

Environmental auditing is a systematic, documented, periodic and objective process in assessing an organization's activities and services in relation to: 1) Assessing compliance with relevant statutory and internal requirements, 2) Facilitating management control of environmental practices, 3) Promoting good environmental management, 4) Maintaining credibility with the public, 5)

Raising staff awareness and enforcing commitment to departmental environmental policy, 6) Exploring improvement opportunities and 7) Establishing the performance baseline for developing an Environmental Management System (EMS). Conducting an environmental audit is no longer an option but a sound precaution and a proactive measure in today's heavily regulated environment. Indeed, evidence suggests that EA has a valuable role to play, encouraging systematic incorporation of environmental perspectives into many aspects of an organization's overall operation, helping to trigger new awareness and new priorities in policies and practices.

ENERGY AND ENVIRONMENT POLICY

The scope of energy and environment policy applies to all employees and students of the Institution aimed at providing an Eco-friendly atmosphere (Aerts et al., 2008; Abba et al., 2018). The concept of eco-friendly culture is disseminated among the students through various awareness programmes, seminars /



conferences, reuse and recycle the waste materials. Attempts is made to limit energy usage and also replace non-renewable energy sources with renewable energy sources. The Head of the Organization, Department Heads and Senior Managers including Management Representatives are responsible for monitoring the go green initiatives of the College / University and maintain a clean/green campus. In addition, the staff and student volunteers are also responsible for the implementation of the green campus and environment policy in the Organization.

Environment Friendly Campus

Eco-friendly literally means earth-friendly or not harmful to the environment. This term most commonly refers to products that contribute to green living or practices that help conserve resources like water and energy. Environment friendly processes are sustainability and marketing terms referring to goods and services, laws, guidelines and policies that claim reduced, minimal, or no harm upon ecosystems or the environment. Companies and Educational Institutions use these ambiguous terms to promote goods and services including working atmosphere / learning environment sometimes with additional, more specific certifications, such as ecolabels. Their overuse can be referred to as greenwashing and green campus. To ensure the successful meeting of Sustainable Development Goals. The International Organization for Standardization has developed ISO 14001:2015, 14020 and ISO 14024 to establish principles and procedures for environmental labels and

declarations that certifies the environment friendly campus. In particular, these standards relate to the avoidance of financial conflicts of interest, the use of sound scientific methods and accepted test procedures, and openness and transparency in the setting of standards.

Similar to that of Green campus facilities, environment friendly campus is meant for providing eco-friendly as well as hygienic atmosphere to the stakeholders without harming the environment. Environment auditing is like a systematic process and a kind of professional tool whereby an organization's environmental performance is checked against its environmental policies and compliances of the Government guidelines. It is almost similar to that



of green auditing except

assessing the flora and fauna. In Environment auditing, carbon footprint is calculated in terms of carbon emission and carbon accumulation in the campus by means of using the number of vehicles, electrical energy utilization efficiency and human population.

In order to provide efficient eco-friendly atmosphere to the stakeholders, the organization provides good drinking water facility to the students and staff members, organic manure, vermin compost, minimizing single-use disposable plastic items, single-use plastic etc. and reduction of use of papers alternated with e-services and e-circulars, proper disposal of wastes, recycling and suitable waste management system. These parameters should be considered while implementing the environment friendly campus in an organization (Lauder *et al.*, 2015; Freidenfelds *et al.*, 2018).

To set a pure atmosphere in an organization campus, waste disposal management should be proper which in turn to restrict the environmental pollution. The waste disposal are the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peels, left-over food etc. Separation of waste is essential as the amount of waste being generated and then segregated properly for proper recycling through the composting process and used as a

fertilizing material.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental protection planning is an important component of overall planning and implementation of eco- friendly and green campus of an organization. It addresses issues ranging from human health and sanitation to various stakeholders of an organization and protection of plants, animals and microorganisms including wildlife habitats (Ghaffarianhoseini *et al.*, 2016). Environmental Management Plan (EMP) is an important integration document between the various approvals,



authorizations and specific components and/ or activities that are carried out in the campus without harming the environment. EMP is committed to manage its assets with its core values to protect the health and safety of people and the environment and to comply with Environment Health and Safety laws, regulations and Health and Safety standards. A clean environment is important for the success of an organization to save for the future generations to ensure its safe use of air, land, and water resources. The main purpose of the EMP is to outline environmental protection measures to be followed during the organization development and to ensure that commitments to minimize environmental effects are met. The EMP should provide a reference document as per the legislative requirements for personnel when planning and/or conducting specific activities in the campus surroundings. In line with the Environment Policy, impact on the physical, chemical and biological environment should be determined along with statutory requirements and other environmental commitments.

Environmental Management Plan and Execution in the Organization sites

S.No.	Monitoring areas	Parameters Monitored	Monitoring frequency	Reason for monitoring parameters
1.	Vegetation (Flora and Fauna)	Survey of macro and micro plants, animals (mammals, birds, moths, houseflies, reptiles, amphibians,	Continuous	Conservation of macro and micro plant, animals (mammals, birds, moths, houseflies, reptiles, amphibians, termites)
2.	Air Emission	O ₂ , CO, CO ₂ , SO ₂ , NO ₂ level in the open, car parking and indoor areas	Monthly monitoring	Unmitigated operations may result in deterioration of air quality
3.	Solid Waste	Solid waste quality and quantity, solid waste disposal, reuse, solid waste treatment	Monthly monitoring	Compliance of Environmental Laws and Legislative policy
4.	Waste water	Primary, secondary and tertiary pollutants and their recycling, waste water minimization, storage and handling, reuse, treatment before disposal	Monthly monitoring	Minimize the water pollution and to provide quality water as per the Central Pollution Board
7.	Soil	Soil contamination, soil edaphic parameters, soil, gravel and sand composition, water holding capacity, soil erosion	Half yearly	Soil surface and water pollution cause diseases as per the Compliance of Environmental Laws and Legislative policy
8.	Noise	Noise intensity, causes and impact, remedies, standard operating procedure	Monthly monitoring	Uncontrolled noise cause nuisance which affect the health

9.	Occupational Safety & Health	Safety, health and welfare of people at occupation, measures taken, Firesafety, First aid box, Safety protocol, Hospital facility	Continuous	Department of Occupational Safety & Health
11.	Restoration of the sites	Vegetation visual analysis, Photographic records	Continuous	Maintain the soil fertility and soil original reclamation

ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT SYSTEM

It is outlined the mitigation measures and the best management practices followed in the organization in terms of developing eco-friendly and green campus. It is recommended to carry out a complete assessment and control of all potential hazards and risks arise in the organization without harming the environment. It is to ensure that no significant adverse environmental health and safety impacts by carrying out various infrastructure facilities created to improve the human eco-system of the organization maybe implemented. The facility should be designed to include fire protection systems, multiple gas, flame, smoke and low- and high temperature detectors and alarms in terms of planning and implementing the best practices of environmental health and safety management system.

The high level of automation, regular preventative maintenance, and safeguards the environmental pollution and the provision for safe emergency shut-downs should be should be maximized in the organization. In addition, all the employees and management people should be trained properly in studying about environmental health and safety management system which will be useful for protecting the environment without causing any adverse effect on the environment. All personnel should be will be advised to undertake an extensive workshop as well as training programmes to ensure safe operating practices such as safety operations, hazards management, safety and emergency procedures and environmental management (Murdifin *et al.*, 2019).

Evacuation Plan in Human Eco-system of the Organization

The management of the Organization should ensure the safety measures to the stakeholders which in turn improve the human eco-system of an organization. In the eco-friendly and green campus, some of the safety measures should be undertaken. The alarm signals such as Bells, Horns, Sirens, Verbal (i.e. shouting) may be used to begin evacuation of the facility in the organization if any unfavorable situation takes place like uncertain firing, explosion of acids and gasses, earth quake, electrical current circuits explorations and etc. Evacuation map may be prominently displayed throughout the facility. The phone number of Fire stations, Police, Ambulance, State Office of Emergency Services, National Response Centre, Division of Occupational Safety and Health, Regional Water Quality Control Board, Pollution and threatened hazardous management & control board and Nearest Hospital. The internal facility alarms as well as communications systems, where applicable, to notify all facility personnel should be activated. The emergency equipment like fire extinguisher, emergency notification and first aid box should be placed in all the dangerous zones. It should be developed and practiced a spill clean-up procedure including where to find emergency equipment and how to use it properly should be trained to all the stakeholders.



An area which is disturbed or polluted by means of discarding the wastewaters, effluents, solid wastes, electronic wastes, plastic wastes, kitchen and food wastes, inert wastes, may be recovered and restored by clean-up procedures (Nascimento and Filho, 2010). It also involves the planting of various vegetation covering trees, shrubs, herbs, climbers, lawns and etc. The re-vegetation may be performed in compliance with applicable environmental requirements and specifications which include requirements for timber removal, slash disposal, and dust control.

WASTE MANAGEMENT PLAN OF THE ORGANIZATION

It provides guidelines and simplify the process of categorizing, quantifying, managing, and disposing of solid wastes in the organization. Waste management is a critical component of organization's operating policies. Waste Management Plan (WMP) includes the proper handling, collection, storage, manifesting, transportation, and disposal/recycling of the solid waste generated without harming the environment. The procedure is designed to

assist in an organization wide effort to provide protection to the environment and to comply with environment laws and legislative policies and regulations regarding proper waste management. The waste management covers solid wastes, electronic wastes, kitchen and food wastes, plastic wastes, wastes and wastewater,. The waste management plan has been developed properly in compliance with environment laws and legislative policies and regulations (Sharp, 2012; Sharma, 2020).

(Setyowati *et al.*, 2017). Additionally, abandoned materials and materials intended to be recycled are considered wastes. It should be taken into account while WMP is prepared and executed in the organization. It is very important to understand this concept, because even though something is going to be recycled, it must be managed as a waste until it is actually recycled. The wastes are categorized as hazardous and non-hazardous wastes depending upon the quantum of causing the adverse effect to the environment. The hazardous waste should be disposed properly by ignitability, corrosivity, reactivity, irritability and toxicity behaviours. In ignitability, the flash point should be less than 60°C. Similarly, in corrosivity, the pH should be less than 2.0-3.5 or greater than or equal to 12.5-13.5. Similar to that of ignitability and corrosivity, the reactivity should be inherently unstable under ordinary conditions or when exposed to water. In irritability, when in contact with body the inflammation should not be caused. Toxicity should not cause risk of injury to health of organisms or the environment. Similar to that of hazardous waste management, non-hazardous waste management is very important and may still present hazards to employees who handle them properly.

All recommended safety and handling practices must be followed properly by the Management. The waste production should be eliminated whenever and wherever possible and the material only for its intended purpose on site should be used. Attempts should be made to minimize waste production, reuse the waste materials, recycle waste on site and then dispose of waste through properly designed. All hazardous waste shall be segregated from other types of hazardous wastes as well as non-hazardous wastes at the point of generation of waste (Hertwich, 2005). At all facilities, the types of containers with colour coding for easy identification should be kept to collect and segregate common wastes across the campus. Food waste shall be collected in separate containers in the campus especially at dining hall, canteen and food courts. All containers must be properly labelled. The label must clearly mention the name or type of waste. Also, if the waste is hazardous, it should be clearly labelled on the container along with its hazardous characteristics (e.g. flammable, toxic, radioactive, etc.).

METHODS OF DISPOSAL OF WASTES

Recycling and reuse methods may be adopted to minimize the quantity of wastes that are generated from the organization requiring disposal in a proper way. Some of the wastes can be reused within the facilities while others can only be recycled in the on and off-sites. e-wastes and plastic wastes including batteries may be sent back to manufacturer or distributor for recycling. Waste shall not be sold to the unauthorized contractors / companies, who may not have proper recycling facilities, to avoid misuse and to reduce associated liabilities (Singhania and Gandhi, 2015).



On-site Disposal facilities: Burial pits may be created in which buried waste should be covered with a thick layer of soil as 'daily cover' to reduce the environmental problems, such as odour from decaying / degrading waste, spreading of waste into other areas due to wind, vermin and disease vector, flies, mosquitoes, etc.

Evaporation Ponds: The evaporation ponds are used to dispose of produced water at some facilities by evaporation. All evaporation ponds should be lined properly.

AIMS AND OBJECTIVES OF ENVIRONMENT AUDIT

An environmental audit programme is conventionally designed and implemented properly which can enhance an industry's environmental performance in a sustainable manner. It is useful to monitor the scale of optimum utilization of the resources and evaluating the company at National and International levels.

The major goals of environment audit are:

To safeguard the environment and reduce the threats posed to human health by the Organization.

To create awareness among the stakeholders about the importance of environmental degradation and conservation as per the Environment Management Systems (ISO standard of 14001:2015) and Environmental Legislations by the Organization.

To establish a baseline information about the eco-friendly environment in the campus to the stakeholders for future sustainability.

To review the disposal of solid wastes and wastewaters in the campus and identify the sources of waste generation and possibilities of mitigation with respect to environmental compliance.

To conduct outreach programmes to the rural, tribal and urban community people on the environment damage and conservation.

To correlate the flora and fauna with environmental sustainability in the audit sites to provide a healthy atmosphere to the members of the Organization.

To take steps to minimize the environmental pollution and degradation by means of developing 'Sanitation and hygiene policy', 'Water conservation policy', 'Waste management policy' and 'Green campus and Environment policy' by the Organization.

To ensuring the legislative compliances and to enable the waste management through reduction of waste generation, solid- waste and water recycling.

To create plastic free campus with the help of management and the stakeholders and to evolve health consciousness among the stakeholders.

To suggest for using alternative energy for the conservation of energy resources.

To evaluate the wastewater quality and determination of wastewater characteristics & their effects on the living system.

To introduce and implement the time saving technologies in production as well as providing eco-friendly ambience in an organization following the latest IT based techniques and to minimize the wastes through modern cleaner technologies.

To develop 'Water conservation policy', 'Waste management policy' and 'Green campus and Environment policy' by the Organization.

Regular environmental auditing once in a year will help in producing environmentally educated & technically sound personals.

SCOPE AND GOALS OF ENVIRONMENT AUDITING

Environmental auditing is often used as a generic term covering a variety of management practices used to evaluate an Organization's environmental performance. Strictly, it refers to checking systems and procedures against standards or regulations, but it is often used to cover the gathering and evaluation of any data with environmental relevance - this should actually be termed an environmental review. An environmental audit is a type of evaluation intended to identify environmental compliance and management system implementation gaps, along with related corrective actions.

Environmental impact assessment is different from environmental audit which is an anticipatory tool that takes place before an action is carried out. It is an attempt to predict the impact on the environment of a future action, and to provide this information to those who make the decision on whether the project should be authorized. It is being carried out when a development is already in place, and is used to check on existing practices, assessing the environmental effects of current activities (Patriarca *et al.*, 2017). It is therefore providing a 'snap-shot' of looking at what is happening at that point in time in an organization. The International Organization for Standardization (ISO) has produced a series of standards in the field of environmental auditing. These standards are basically intended to guide organizations and auditors on the general principles common to the execution of environmental audits. In order to set a pure atmosphere free from pollution to the stakeholders in an organization campus, waste disposal management for both wet and dry wastes and recycling activities should be proper which in turn to restrict the environmental pollution.

The Management of the Organization (Auditee) should be shown their inherent commitment towards making ecofriendly atmosphere through the Environment auditing and ready to encourage all types of Environment related activities. They should promote all kinds of Environment related activities such as conduct of environment awareness programmes, campus farming, planting trees, and maintenance of greening, irrigation, use of bio fertilizers and avoidance of chemical fertilizers and agrochemicals on the campus etc., before and after the Environment auditing. The management should formulate 'Green and Environment Policies' based on Environment auditing report. A clean and healthy environment should enhance an effective teaching and learning process and provides a conducive learning environment to the stakeholders (Fachrudin, *et al.*, 2019). They should create the awareness on the importance of environment through environmental education among the student members. Environment Audit is the most efficient and ecological way to manage environmental problems.

In addition, the scope of an audit can vary from simple compliance testing to a more rigorous examination, depending on the perceived needs of the

management. The technique is applied not only to operational environmental, health and safety management including monitoring, but increasingly also to product safety and product quality management, and to areas such as loss prevention. In environmental studies, it includes the site history, storage of materials in above ground and below ground, the disposal of liquid or hazardous wastes properly in onsite and offsite. It also pays attention in oil or chemical spill prevention. In the subset of safety it includes Special procedures for confined space entry, work on electrical equipment, breaking into pipelines, having firefighting equipment's, conducting safety training programmers for the stakeholder's and etc. (Costantino *et al.*, 2018).

The waste disposal management covering collection, transport, treatment and disposal of waste and converting the waste into fertilizing materials should be proper in the organization campus. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peds, left-over food etc. which will be segregated based on the nature of degradability.

ENVIRONMENTAL AUDIT SCHEMES AND THEIR COMPONENTS

This particular tool is very important aspect of the environmental audit for the total management system in terms of its being an asset or a liability for the industry's environmental performance (Peters and Romi, 2014). Environmental system is with a broad aim for a green environment. It helps in reducing all types of solid, water, electronic and biomedical wastes. It helps in assessing compliance with regulatory requirement. It also helps in prevention control of effect of pollutant in water and soil.

ROLE OF ENVIRONMENTAL AUDIT AND ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental audit should be set in the framework of an environmental management system (Choy and Karudan, 2016, Arora, 2017). An environmental management system (EMS) provides a mechanism for systematically managing the environmental effects of an Organization. EMSs provide a framework to:

- Identify the environmental effects and document regulatory requirements
- Set objectives and targets for future environmental performance
- Implement procedures and measures for achieving the objectives and targets
- Undertake audits to assess environmental performance and the effectiveness of measures to achieve the defined objectives and targets.

In order to ensure that any other stakeholders understand the environmental management system usually rely heavily on documentation and verification. Environmental effects, environmental regulations, objectives and targets, and the procedures are usually all documented.

TARGET AREAS OF ENVIRONMENTAL AUDITING

Auditing for Water Management (Wastewaters and effluents)
 Auditing for Waste Management (Solid and Electronic)
 Auditing for Energy Management (Electrical energy)
 Auditing for Soil Analysis (Soil health, degradation and conservation)
 Auditing for Carbon Footprint (Electrical appliances and human population)
 Auditing for Green Campus facility (Correlated with Green Campus Audit)
 Auditing with the Organization's Management for financial allotment
 Auditing with the Stakeholders for their contribution on environment studies
 Environmental Education and Implementing Swachh Bharath Abhiyan Scheme

PROCEDURES FOLLOWED IN ENVIRONMENT AUDIT

Environment Systems Audit

Environmental Systems audit involves monitoring an Organization concerning about the green campus, environment, sanitation and hygiene policies. It is a regular process that is conducted periodically by a regulated entity to check whether an Organization meets the requirements of environmental compliance. The process of audit includes examining, collecting, evaluating, documenting data and analyzing various components related to environmental aspects (IGBC, 2021; WGBC, 2021). Environmental audit was carried out as per the procedures mentioned of the Manual of Gnanamangai *et al.* (2021). The environmental audit possesses the following characteristic features in which various aspects of wastes generation and steps taken by the Organization to reduce both solid and liquid wastes without harming the environment.

Identification of various sources to generate wastes and types of degradable and non-degradable wastes in the campus.

Collection of information related to type of operations, use of various raw materials and products that generate wastes.

Finding the highlights of inefficiencies in the process that generate wastes and areas that are to be monitored with extra care.

Setting up the target for reduction of wastes and source of waste generation without affecting the environmental health.

Steps taken to minimize the environmental pollution and degradation by means of developing internal policy methods.

Suggestion of cost effective waste management strategies and zero waste discharge in the Organization.

Creation of awareness among stakeholders on the benefits of reducing wastes without damaging the ecosystem.

Aids in increase of process efficiency and status report with regards to environmental compliance and management.

Carbon footprint by measuring Carbon dioxide level in the Campus

The level of Carbon dioxide is measured in different places across the

Organization campus using a portable CO₂ Analyzer (Non dispersive infra-red

meter). In addition, CO₂ meter is also displayed the readings of atmospheric temperature, relative humidity and dew point in the places, where the level CO₂ is measured. The meter started measurements of CO₂ level in the atmosphere after powered ON and updated the readings every second in the display screen. If the operating environment is changed (example from high to low temperature) which took 30 seconds for CO₂ sensor to respond and 30 minutes for flexibility in relative humidity. The meter features an audible alarm to give warnings when CO₂ concentration exceeds the set limit. It emits beeps (Abt.80dB) when CO₂ level goes over the set value and stops when any key (except SET) is pressed or the readings fall below the set values. The Carbon footprint per year is calculated (www.carbonfootprint.com) based on electricity usage per year in which CO₂ emission from electricity

Steps involved in the Process of Environmental Audit

Step #1: Opening meeting among the audit team and auditees, discussed about the audit procedure and document verification.

Step #2: Visited the on-site of the audit along with the audit team and auditees.

Step #3: Walked around campus to check the facility as walk-through audit and took photographs for preparing the audit report.

Step #4: Monitor the components as per the environmental audit checklist (Sanitation and hygiene, water conservation, waste management and green campus and environment policies).

Step #5: Noted down what all components are present and what are all not available in the campus as of environmental audit components listed by QCA ISO- EMS checklist.

Step #6: Identified the issues in the campus with respect to the environmental compliance and strengths and weaknesses of the Auditee's Management controls and risks associated with the audit.

Step #7: Looked into other items to be monitored as per the NSF checklist with respect to Ecology and Environment studies.

Step #8: Exit meeting held after the audit in which the audit findings with the members of the Organization was discussed.

Step #9: Prepared and distributed the findings as a Report and Certificate along with the recommendations including the best practices followed by the Auditee.

Step #10: Comparison between the last audit report with the present audit report in which the number of suggestions and recommendations were taken into consideration and rectified significantly by the Management.

Step #11: Observed the audit process undertaken by the certifying agency between the last audit and current audit processes, whether the same certifying agency has undertaken the audit process or not?

PHASES OF AN ENVIRONMENTAL AUDIT

The environmental audit encompasses three phases such as pre-audit, during-audit and post-audit. These phases involve various components to resolve the problems in the campus as well (Arora, 2017; Gnanamangai *et al.*, 2021).

Pre-Audit

Pre-audit involves the following components:

- Planning the environmental audit
- Selecting the audit team based on experience and expertise
- Scheduling the audit facility and venue of audit
- Scrutinizing the audit application and checklist
- Opening meeting between audit team and auditee
- Acquiring the background information of the organization
- Visiting the site of audit by the audit team and coordinators
- Audit programme and briefing
- Collection of data and documents verification
- Discussion with the auditee for data verification

During-Audit

During the audit, the following components are involved:

- Understanding the scope of audit
- Analyzing the strength and weakness of the internal controls audit
- Conducting the on-site audit
- Evaluating the observations of audit programme
- Noting down the key observations and taking photographs
- Clarifications if required during the audit site and document verification

Post-Audit

Post-audit involves the following components:

- Identification of the best practices followed by the Organization
- Compiling a report of the data collected
- Distributing the report and certificate to the Organization
- Preparing an action plan to overcome the flaws
- Providing suggestions to implement the action plan
- Setting up the future environmental aims and objectives

COMPONENTS OF AN ENVIRONMENTAL AUDIT

Environmental audit has five components, namely:

- Sanitation and hygiene policy
- Green and Environment policy
- Water conservation policy
- Water management policy
- Waste management policy
- Environment conservation policy
- Waste management initiatives
- Environment management policy
- Environment monitoring policy

Sanitation and Hygiene Policy

In this component, the following are being considered:

- Physical appearance and overall ambience
- Adequacy of toilets (Student/Employee: toilet ratio)
- Gender balance and disabled-friendly toilets (Male: Women)
- Water taps and sanitation plumbing, adequacy and efficiency
- Adequate clean drinking water facilities
- Kitchen staff apparel and hygiene
- Kitchen hygiene and fly proof condition
- Cutlery, crockery and utensils hygiene
- Dining hall hygiene and bad odour free
- Cleaning equipment and consumables

Water Conservation Policy

In this component, the following are being considered:

- Know the source of the campus water availability
- Monitor overhead tanks for periodical cleaning
- Reuse of treated water, recycling, leakages etc.
- Drip irrigation / sprinkler irrigation system for watering to plants
- Water efficient dispensing mechanism in campus

Waste Management Policy

In this component, the following are being considered:

- Is the campus a 'Plastic free zone'?
- What are the methods adopted for waste segregation and storage?
- Disposal of solid wastes, reuse and recycling process
- Adequate number of waste bins, separate bins for dry and wet wastes
- Food waste dumped status methods of disposal

Waste Management Initiatives

In this component, the following are being considered:

- Sign boards indicating energy / water conservation in respective places

- Awareness sign boards on plastic usage and plastic free campus
- Programmes related to waste segregation / waste disposal systems
- Sufficient ventilation facility
- Social responsible activities

A good environmental audit

Defines sources, quantifies types of waste being generated

Collates information on unit operations, raw material, products and water usage

Highlights process inefficiencies and areas of poor management

Helps in setting targets for waste reduction

Permits the development of cost effective waste management strategies

Raises awareness in the workforce regarding the benefits of waste reduction

Helps to improve process efficiency

Assess the quantity of water usage within the company.

Find out various sources of organic and solid waste generation and mitigation possibilities.

Document the waste disposal system

Bring out a status report on environmental compliance.

Waste minimization opportunities realized, that contributes to reduction in operating price.

Increased worker cognizance of environmental standards and responsibilities.

Improve employee relations and morale.

Improve the image of organization and its good will.

Maintenance of sustainable stage of improvement.

ABOUT THE ORGANIZATION

ANJUMAN - I - ISLAM'S IHMCT is one amongst the floral tiara of Anjuman-I-Islam's Education Trust. It is conveniently located in the heart of Mumbai at Chhatrapati Shivaji Terminus (V.T) which covers the important business area of Mumbai.

Anjuman - I - Islam is a premier Educational and Social Organization of India, established in the year 1874 by a group of visionaries led by the Late Justice Badruddin Tayabji. It has a glorious past of more than 130 years dedicated to the cause of education and social service.

The Education Trust mainly stands for Secularism and National Integration. Today with well over 100,000 students, Anjuman -I - Islam is well poised to be declared a deemed University.

It has established three Orphanages, a Centre for Distressed Families and Ambulance Services.

It is the only Institution in the State of Maharashtra, which has been awarded the prestigious Maharashtra Government's "State Award 2000" for excellence in Educational and Social Activities.

The trust is headed by the dynamic President Dr. Zahir I. Kazi who is supported by his dedicated team.

Anjuman - I - Islam's IHMCT recognize and keeps abreast with the multification role of Education in the 21st century, thus contributing to Nation building.

MISSION & VISION

Mission

To emphasize upon Theory and Practical- where the students gain the breath of knowledge and the depth of experience that address the evolving needs of business and industry.

Vision

To Inculcate Excellence in Hospitality Education and State of the Art Technology



QUALITATIVE AND QUANTITATIVE MEASUREMENTS OF THE ENVIRONMENT AUDIT

It covers both qualitative and quantitative measurements including physical observation of eco-friendly environment set-up. The qualitative and quantitative measurements such as achievement of environmental objectives and targets by implementing agency (Auditee), appointment of Environmental Engineers and Agriculture Staff working for environment monitoring, Drinking water / RO water / Borewell water / Open well water / Pond water / Municipal or Corporation water facility to the stakeholders and periodical checking of drinking water quality, Solid waste management facility, Air ventilation at Indoor / Outdoor auditorium, seminar / conference halls, classrooms, hostel, canteen, staff rooms, laboratories, restrooms, etc., Housekeeping, storage, areas, piping, plumbing and etc. facility, Sign boards indicating plastic free campus, don't wastewater etc. The ratio of Environmental sustainability courses (Environmental Science, Sustainability, Climate change, Global warming, etc.) to total courses / subjects to under graduate and post graduate course students, per capita water consumption per day and carbon footprint in the Organization campus due to an extensive use of vehicles, electricity usage and human population load are also analysed during the environment audit. These qualitative and quantitative measurements are playing important role in environment sustainable development in the campus

An account of a large number of Oxygen producing and Carbon-di-oxide absorbing plants planted in the Campus are taken into consideration to give pure atmosphere to the stakeholders. Outreach programmes may be conducted for dissemination of natural resources management, environmental pollution studies, green and eco-friendly atmosphere pledge initiatives to rural, tribal and urban people across the country. Signing of MoU with Govt. and NGOs to ensure ecofriendly campus maintenance, conduct of awareness programmes and cultural activities for environmental monitoring and ecosystem maintenance to the stakeholders.

Steps taken for organic, inorganic, e-waste, food, sewage waste management, segregation of wastes and reuse methods, public transport, low-carbon emitting vehicles, battery operated vehicles, bicycles, biofuel use and control of car smokes and exhaust with respect to routine FC services, steps taken to take care of daylighting, AC machine heat and carbon dioxide emission & carbon sequestration, Eco-friendly Refrigerants, instruments and materials use including Energy efficiency measures taken, Mosquitos, vectors and predators identified in the campus which are the root cause of various diseases spreading to students and impactful organization programmes on climate change, global warming and environmental protection are taken into account while environment audit is carried out. In addition, academic credentials like taking up major and minor Projects, Dissertations, Thesis work and Scholarly

publications on environmental science, engineering, technology and management domains carried out by students and staff members may be taken into account towards environment sustainability management. Best practices followed on green campus and eco-friendly set-up initiatives, planning and efforts in the Organization and recommendations for improvement are illustrated in the audit report as well.

OBSERVATIONS OF THE ENVIRONMENT AUDIT

Plastics use and their impact on the environment The Ministry of Environment, Forest and Climate Change, Government of India has notified the Plastic Waste Management Rules, 2016. A Central Pollution Control Board report indicated that the total annual plastic waste generation in India at a humungous is around 3.3 million metric tonnes per year for which the data were collected from 60 major cities in India. The country generates around 26,000 tonnes of plastic waste a day out of which 60% of plastic produced is recycled. But the problem with plastic is that most of it isn't biodegradable. It doesn't rot, like paper or food, so instead it can hang around in the environment for hundreds of years. More than eight million tonnes of plastic enters the world's oceans each year and most of that escapes from land. It is observed that 96% of plastic wastes are collected and segregated by the respective urban bodies in which the recyclable plastic waste are sold to the recyclers and non-recyclable plastic waste are sent for co-incineration in cement plants. People should be asked to use reusable items and initiate models which allow up-cycling of waste items for better use. This will help reduce plastic waste from urban local bodies, as well as curb the value for waste among the citizens. Plastic waste management is very important, because plastic destroys food chains, only 9 percent of the total plastic waste in the world is recycled.

People use plastic bags and plastic ware items every day to hold objects like meals, clothes, grocery and stationary items, which can be bought from shops. Generally, the plastic items are non-degradable in nature that lead to soil pollution and affect the soil health significantly (Lazarevic *et al.*, 2010). Most of the plastic items are considered as solid waste. This has resulted in many damaging environmental effects inclusive of animal choking, pollution, blockage of channels, rivers and streams, and landscape disfigurement. According to the World Health Organization (WHO) report, plastic items take at least 400 years to decompose completely in the soil which illustrates the subsequent effects on the environment. Plastic pollutants form a basis for damage to humans, animals and flora through toxic pollution. It can take masses or even heaps of years for plastic to break down so the environmental harm is lengthy-lasting. It impacts all organisms in the food chain from tiny species to big ones. There is a need to reduce the plastic use to effectively limit plastic waste in the campus (Eriksson *et al.*, 2016).

AIHM MUMBAI has taken sufficient attempts not to use plastics in the campus and displayed a slogan 'Plastic free campus' in places like dining halls, auditorium, corridors, etc. to the students, parents and public. The AIHM Mumbai 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.

SOLID WASTE MANAGEMENT PRACTICES AT AIIHM MUMBAI

Solid waste control is a term that is used to consult the method of accumulating and treating solid wastes by following the method of eco- friendly manner. It also offers solutions for recycling objects that do not belong to garbage or trash. As lengthy as humans have been living in settlements and home regions, rubbish or solidwaste has been a difficult task. 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.



The Ministry of Environment, Forest and Climate Change, Government of India has notified the Solid Waste Management Rules, 2016. As per the rules, solid waste means solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities. As per the rules, the local bodies are responsible for the collection, treatment and disposal of solid wastes (Irwansyah, 2017; Irwansyah *et al.*, 2017). The 'Central Board of Solid Waste Management' is the monitoring authority under the said rules and is responsible for granting authorization to local bodies for processing and disposal of solid waste.

AIIHM Mumbai has a very good solid waste recycling procedure 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 Departments, laboratories, dining area every day and dumped in the place which is subsequently segregated based on the nature of degradability. The segregated items are neatly packed in bins 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.

Waste Management Practices

In AIHM Mumbai had quantified a daily average of wastes in which food waste is about 37%, recyclable waste is about 27% and other organic waste is about 36%. The study revealed that the solid wastes needs to be professionally handled. The solid wastes are collected from different places of AIHM Mumbai and segregated based on degradable and non-degradable materials subsequently subjected for recycling and degradation processes like composting. Details of the waste management practices in AIHM Mumbai are

- 1) Bio-degradable waste handling,
- 2) Sewage Treatment Plant
- 3) Disposal of E-Waste.

Bio-degradable and Non-degradable waste materials Management Practice

For the purpose of segregation of waste (Organic, recyclable, non-recyclable and e- waste) at source and collecting the same in 'Waste Bins' are placed at designated locations in the Campus viz. Students hostels, Staff quarters, Department Laboratories and common places.

Disposal of e-Waste at AIHM Mumbai



The Ministry of Environment, Forest and Climate Change, Government of India notified the E-Waste Management Rules, 2016. Electronic waste or e-waste comprises old and end of life electrical and electronic appliances such as telephones, cellular telephones, computers, laptops, television sets, refrigerators, washing machines, air-conditioners, fluorescent and other mercury containing lamps etc. The rules apply to every Manufacturer, Producer, Consumer, Bulk Consumer, Collection Centre, Dealer, E-Retailer, Refurbished, Dismantler and Recycler involved in the manufacture, sale, transfer,

purchase, collection, storage and processing of e-wastes or electrical and electronic equipment. As per the Rules, the producer of the electrical and electronic equipment shall be responsible for collection and channelization of e-wastes generated from the 'end-of- life' of their products under Extended Producer Responsibility (EPR).

In compliance to the E-Waste Management Rules, 2016, Government of India, e- waste materials were collected from AIHM MUMBAI are being segregated and then sold to Authorized Agencies. Due to this e- waste activity disposal, the e-waste pollution is significantly reduced in the AIHM Mumbai. However, a proper method of e-waste disposal should be done in coming

years in collaboration with Maharashtra State Pollution Control Board as per the E-Waste Management Rules, 2016.

WASTE DISPOSAL AND TRACKING FORM

Name of the Organization

Anjuman I – Islam’s Institute Of Hospitality Management

Address of the Organization

92, Dr, Dr Dadabhai Naoroji Rd, opp. Chhatrapati Shivaji Maharaj Terminus, Dhobi Talao, Chhatrapati Shivaji Terminus Area, Fort, Mumbai, Maharashtra 400001Mumbai – 400 001, Maharashtra.

Date of Waste Disposal

From April 2021 to March 2022

Reporting Team and details

IQAC and NAAC Teams

S.No.	Types of Waste	Approximate Quantity / Unit Disposed	Disposal Location (On-site / Off-site)	Authorized Company responsible for recycling
1.	Aerosol Cans (Empty)	Not Applicable	--	--
2.	Food Waste	Not Applicable	--	--
3.	Aluminum, Metal Cans, Tins	Not Applicable	--	--
4.	Asbestos	Data available with the Respective staff	--	--
5.	Batteries (Dry)	No data available	--	--
6.	Batteries (Lead Acid)	No data available	--	--
7.	Biomedical Waste	Not Applicable	--	--
8.	Car exhaust	Not Applicable	--	--
9.	Charcoal	Not Applicable	--	--
10.	Clinical Waste	Not Applicable	--	--
11.	Cloth Materials Waste	Not Applicable	Off-site	--
12.	Construction Waste	Data available	Off-site	Mumbai Corporation
13.	Condensate Waste	Not Applicable	--	--
14.	Crude Oil	Not Applicable	--	--
15.	Descaling Acids	Not Applicable	--	--
16.	Drilling Fluids / Solids	Not Applicable	--	--

17.	Drums and Containers (Empty)	Not Applicable	--	--
18.	Effluents from major equipment	Not Applicable	--	--
19.	Electrical Waste (Wires, Switches, Fans, A/C machines, Holders, Meters, Coils, etc.)	Data available with the Respective Officer	Off-site	--
20.	Electronic Waste (Computer, Laptop, CD, Pendrive, Key boards, Mouse, Printers, UPS)	Data available with respective Departments	Off-site	-do-
21.	Fertilizer Waste	Not Applicable	--	--
22.	Filters	Not Applicable	--	--
23.	Fluorescent Light Tubes	Data available with the Respective staff	Off-site	--
24.	Food Waste	Data available with the Hostel / Canteen	Off-site	-do-
25.	Furniture Items	Data available with the Respective staff	Off-site	-do-
26.	Garbage and Cardboards	Data available with the Respective staff	Off-site	-do-
27.	Glass Bottles	Data available with the Respective staff	Off-site	-do-
28.	Glassware items Waste	Data available with the Respective Departments	Off-site	-do-
29.	Glycols	Not Applicable	--	--
30.	Hazardous Waste	Not Applicable	--	--
31.	Household items	Not Applicable	--	--
32.	Human Waste	Municipal Corporation	On-site	--
33.	Inert Waste	Not Applicable	--	--
34.	Laboratory Wastes	Data available with the Respective Departments	Off-site	--

35.	Lights and Bulbs	Data available	Off-site	Mumbai Corporation
36.	Kitchen Waste	Data available with the Hostel Office	On-site	--
37.	Metal Waste	No data available	--	--
38.	Napkins	Human Resource	On-site	--
39.	Oil Contaminated Soil	Not Applicable	--	--
40.	Oily Sludge & Rags (Used)	Not Applicable	--	--
41.	Packaging Waste	Data available	Off-site	Mumbai Corporation
42.	Paint Waste	Data available	Off-site	Mumbai Corporation
43.	Paper Waste	Data available	Off-site	Mumbai Corporation
44.	Pathological Wastes	Not Applicable	--	--
45.	Pigging Wastes	Not Applicable	--	--
46.	Plant Wastewater	Not Applicable	--	--
47.	Plastic Waste	Data available with the Respective Engineer Office	Off-site	Mumbai Corporation
48.	Plasticware items Waste	Data available with the Respective Engineer Office	Off-site	-do-
49.	Produced Water Waste	Not Applicable	--	--
50.	Radioactive Waste	Not Applicable	--	--
51.	Rinsate Waste	Not Applicable	--	--
52.	Rubber Waste	Not Applicable	--	--
53.	Sanitary Wastewater	Data available with the Respective Engineer Office	On-site	--
54.	Scale (Pipe and Equipment)	Data available with the Respective Engineer Office	Off-site	--

55.	Sewage Sludge	Data available with the Respective Engineer Office	On-site	--
56.	Solvents	Data available with the Respective Departments	Off-site	--
57.	Sludge and allied	Not Applicable	On-site	--
58.	Trash Glass Metal Plastic Oils General Trash	Data available in appropriate places	Off-site	Mumbai Corporation
59.	Synthetic Dyes, other items	Data available with Textile Department	Off-site	-do-
60.	Textile Waste	Data available with Textile Department	Off-site	-do-
61.	Used Engine Oil	No data available	--	--
62.	Wastewaters (Liquid Waste: Detergents, Soap, Oil, etc)	No data available	--	--
63.	Wood Waste	No data available	--	Mumbai Corporation

Auditing for Energy Conservation and Management

AIIHM MUMBAI has a substantial the energy conservation initiatives with very good savings opportunities. Energy efficient lighting schemes and awareness created among stakeholders are being practiced by the institution. There are some best Practices followed on Energy Audit in the Organization like awareness boards on ‘Dangers’ and ‘Warnings’. It is observed that the most of places, sign board of ‘Switch ON’ and ‘Switch OFF’ are kept towards saving energy measures to the stakeholders. Electrical wires, switch boxes and stabilizers are properly covered without any damage which will cause any problems to the staff and student members. Adaptation of drip and sprinkler irrigation to save water in the vertical garden.

IHM MUMBAI has established a small Vermicomposting unit in which all the degradable items such as leaf litters, vegetable wastes obtained from kitchens are used to produce vermicomposting.

Few recommendations, in addition, can further improve the energy savings of the Organization. This may lead to the prosperous future in context of Energy Efficiency Campus and thus sustainable environment and community development to the stakeholders in coming years to come.

RECOMMENDATION

Effective Segregation & Bio Inoculants

- The solid wastes that are collected from different places of the campus must be further effectively segregated based on bio-degradable and non-degradable materials.
- Suitable bio inoculants may be used to degrade the solid wastes effectively in the composting unit.

Green manures for Nourishing Vegetation

- Natural or eco-friendly methods should be used to grow plants vigorously in the campus which could reduce the environmental pollution.
- Use of organic green manures can be used to grow healthy medicinal plants in the campus garden and terrace garden.
- A concrete or ground level green manure production unit and vermicomposting units will help to convert all the plant based wastes into green/organic manures. This will be a healthy way of solid litter waste management in the campus.

PLANTS ON CAMPUS

The predominant families of various monocot and dicot plants of oxygen producing and CO₂ absorbing plants found in the AIHM MUMBAI are Acanthaceae, Anonaceae, Arecaceae, Bignoniaceae, Caesalpiniaceae, Combretaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Lythraceae, Malvaceae, Meliaceae, Moraceae, Myrtaceae, Nyctaginaceae, Phyllanthaceae, Polygalaceae, Rutaceae, Rubiaceae, Turneraceae, Verbenaceae and Vitaceae.

Oxygen producing and Carbon dioxide absorbing plants [Sacred fig tree (*Ficus religiosa*) Indian Sandalwood tree (*Santalum album*)]

AIHM Mumbai has taken sufficient attempts by means of creating environment awareness programmes to the people and also offering various core and elective courses to the students and scholars in their curriculum connected with environment.

Eco-friendly Campus made available in the AIHM Mumbai

Environmental Education

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 organized efforts to teach how natural environments function, and particularly, how human beings can manage behaviour and ecosystems to live sustainably. It is a multi-disciplinary field integrating disciplines such as Biology (Botany and Zoology), Chemistry, Physics, Ecology, Environmental Science & Engineering, Earth Science, Atmospheric Science, Mathematics, and Geography

ENVIRONMENTAL & SUSTAINABLE TOURISM
SEMESTER V MANDATORY SUBJECT

UNIVERSITY OF MUMBAI – B.Sc.(Hospitality Studies)
SEMESTER – V Page 33 of 37

• Contents of syllabus for USHO504

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Environmental Studies 1.1 Definition, Scope and Importance 1.2 Need for public awareness 1.3 Renewable & Non-renewable Resources (Definition & Importance) 1.4 Consumerism & Waste Products	15	15
	2	Introduction to Tourism & Travel 2.1 Flashback – From early times till today (Purpose of travel in ancient times, invention of wheel, contribution of Thomas Cook, today's scenario). 2.2 Definition of Tourism as stated by U.N.W.T.O. 2.3 Types of Tourism-Pilgrimage, Business Tourism, Health Tourism, Adventure Tourism, Sports Tourism, Culinary & Wine Tourism. 2.4 Definition of Travel 2.5 Various modes of Transport – Land (Rail and Road), Water (Ferries and Cruises), Air.		
Unit No.	Chapter No.	TOPIC	Hours	Marks
02	3	Tourism Organisations 3.1 National/Domestic Organisations (M.T.D.C., I.T.D.C.) 3.2 International Organisations (U.N.W.T.O., W.T.T.C., U.F.T.A.A., U.N.E.S.C.O., S.T.I.)	15	15
	4	Sustainable Development 4.1 Why Sustainable Development? 4.2 Rio Summit 4.3 Impact of Tourism on the World		
Unit No.	Chapter No.	TOPIC	Hours	Marks
03	5	Sustainable Tourism 5.1 Introduction to Sustainable Tourism 5.2 Sustainable Tourism with respect to Developed Countries (List of these countries, one major destination from each country that requires Sustainable development) 5.3 Sustainable Tourism with respect to Developing Countries	15	15

		(List of these countries, one major destination from each country that requires Sustainable development)		
		5.4 Sustainable Tourism in India		
		5.5 Sustainable Tourism in Mumbai		
		5.6 Sustainable Tourism as an Umbrella – Ecotourism, UNESCO Sites.		
		5.7 Impact of Travel on Sustainable Tourism		
		5.8 Impact of Accommodation on Sustainable Tourism		
		5.9 Responsible Tourism – Guidelines, “Making Tourism More Sustainable – A Guide for Policy Makers” – Role of United Nations Environment Programme (UNEP).		

Napkin disposal facility

The Management of AIIBM MUMBAI is implementing the safe practices of disposing of napkins using small scale incinerators in ladies hostels. Incinerators 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 Campus is taking care of adolescent girls and ladies significantly in their personal hygiene.



Ventilation and Exhaust systems in Buildings

Ventilation is necessary in buildings to remove 'stale' air and replace it with 'fresh' air. This helps to moderate internal temperatures, reduce the accumulation of moisture, odours and other gases that can build up during occupied periods. AIIBM MUMBAI has a large number of ventilators for effective air circulation. Ventilation and Exhaust system Facilities in Buildings towards air circulation and heat exchange phenomena at AIIBM MUMBAI

Measurement of Carbon dioxide level in the Campus

In general, a portable CO₂ Analyzer is used to measure the level of carbon dioxide in the atmosphere at different places across the AIIBM MUMBAI. The observation showed that the concentration of CO₂ in the atmosphere is found to be low which did not exceeds the critical limit of CO₂. It is further revealed that all the selected locations are having pure air without any air contaminants with good air exchange/circulation in the campus.

Measurement of Carbon dioxide concentration in the AIIBM MUMBAI

S.No.	Different locations of the Organization's Campus	Carbon dioxide level (ppm)	Remarks
1.	Classroom	452	CO ₂ level is low
2.	Office	469	CO ₂ level is low
3.	Staffroom	460	CO ₂ level is low
4.	Auditorium	589	CO ₂ level is low
5.	Library	568	CO ₂ level is low
6.	Parking	398	CO ₂ level is low
7.	Open Space	370	CO ₂ level is low

Reference of Set values of CO₂ level

350-1000 ppm: Typical level found in occupied spaces with good air exchange

along with pure air.

1000-2000 ppm: Moderate level associated with complaints of drowsiness and poor airquality.

2000-5000 ppm: Critical level associated with headaches, sleepiness, and stagnant, stale, stuffy air. Poor concentration, loss of attention, increased heart rate and slight nausea may present.

Auditing for Carbon Footprint at Educational Institutions

The observation on carbon footprint due to electricity usage per year at AIHM Mumbai showed 5488.12 metric tons. It is calculated based on CO₂ emission from electricity per year in kWh/1000units. The recorded value of carbon footprint due to car usage per year is 803 metric tons. The Carbon footprint due to Motorcycles usage per year is 803 metric tons which is derived based on the number of motorcycle entering into the Organisation multiplied with the approximate travel distance of a vehicle each day inside campus (in kilometres). The overall results indicated that total carbon emission at AIHM Mumbai per year is 2163 metric tons per year. The carbon footprint

Calculation of Carbon Footprint Per Year at AIHM Mumbai

The Carbon footprint calculation can be conducted based on the stage of calculation as stated in www.carbonfootprint.com, which is the sum of electricity usage per year

Electricity usage per year

The CO₂ emission from electricity

= (electricity usage per year in kWh/1000) x 0.84

= (169973 kWh/1000) x 0.84

= 142.777 metric tons

Notes:
Electricity usage per year = 169973 kWh

0.84 is the coefficient to convert kWh to metric tons.

Transportation per year (Car)

= (Number of cars entering the Campus x 2 x approximate travel distance of a vehicle each day inside campus only (in kilometers) x 365/100) x 0.02

= [(1000 x 2 x 5.5 x 365)/100] x 0.02

= 803 metric tons

Notes:

365 is the number of working days per year

0.02 is the coefficient to calculate the emission in metric tons per 100 km car

Transportation per year (Motorcycles)

= (Number of motorcycle entering the Campus x 2 x approximate travel distance of a vehicle each day inside campus only (in kilometres) x 365/100) x 0.01

= [(2000 x 2 x 5.5 x 365)/100] x 0.01

= 803 metric tons

Notes:

365 is the number of working days per year

0.01 is the coefficient to calculate the emission in metric tons per 100 km for motorcycles

Total Carbon emission per year

= total emission from electricity usage + transportation (bus, car, motorcycle)

= 142.77+ (4 + 803 + 803) / 0.81 (Constant Factor)

= 2163.91 metric tons

Auditing for Water Management at AIIHM Mumbai

Water is a natural resource which is an essential resource for all life in the planet. It is observed that on earth only three percent of it is fresh and two-thirds of the freshwater is locked up in ice caps and glaciers.

Water Management Activities

Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water (Senior and Brightman, 2015).

AIIHM Mumbai is taking enough attempt to manage wastewater that are coming out from various Departments and laboratories. In general, water management activities are very important in terms of conserving water and its resources for future generations which in turn useful to reduce the land contamination.

An advisory committee may be constituted to guide the initiative on water conservation.

- Physical Appearance and Overall Ambience on Water Conservation
- Adequacy of Water
- Plumbing adequacy of water taps and sanitary fixtures
- Water Efficient Toilets
- Dedicated Staff for Water Maintenance & Inspection
- Periodic mending and repairs of leaks in taps and pipes
- Two levels of flushing in all the toilets
- Planting indigenous variety of plants and less water requiring plants
- Organizing water conservation workshops to the faculty and students on the campus

Water Quantity Estimation

The quantity of water required for municipal uses for which the water supply

schemehas to be designed requires following data:
 Water consumption rate (Per Capita Demand in litres per day per head)
 Population to be served.

Quantity = Per capita demand x Human population

Water Consumption Rate

It is very difficult to precisely assess the quantity of water demanded by the public, since there are many variable factors affecting water consumption by various stakeholders of an organization. The various types of water demands, which a city may have, may be listed into following classes:

Water Consumption for Various Purposes at AIHM Mumbai

S.No	Types of Consumption	Normal Range (lit/capita/day)	Average	Percentage
1.	Domestic Consumption	65-300	160	35
2.	Consumption in Laboratories	45-450	135	30
3.	Public Uses including Fire Demand	20-90	45	10
4.	Losses and Waste as routine consumption	45-150	62	20
5.	Daily use (Day-to-day use)	20-40	15	05

Estimation of Water requirements for drinking and domestic use

(Source: National Building Code 2016 BIS)

As a general rule the following rates per capita per day may be considered for domestic and non-domestic needs. For Communities with population 20,000 to 10,000 together with flushing the per capita per day rates may be considered for domestic and non-domestic needs.
 100 to 135 lphd (135- Avg) system.

Water requirements calculation

S.No	Educational Institutions water requirements	Domestic use (lphd)	Flushing (lphd)	Total use (lphd)
1.	Without Boarding Facility	25	20	45
2.	With Boarding Facility	90	45	135

Fire Fighting Demand

The per capita fire demand is very less on an average basis but the rate at which the water is required is very large. The rate of fire demand is sometimes treated as a function of population and is worked out from following empirical formulae:

Per capita fire demand calculation

S.No	Authority	Formulae (P in thousand)	Q for 1 lakh Population)
1.	American Insurance Association	$Q \text{ (L/min)} = 4637P^{(1 - 0.01 \sqrt{P})}$	41760
2.	Kuchling's Formula: per capita fire demand	$Q \text{ (L/min)} = 3182 \sqrt{P}$	31800
3.	Freeman's Formula: per capita fire demand	$Q \text{ (L/min)} = 1136.5(P/5 + 10)$	35050
4.	Ministry of Urban Development Manual Formula	$Q \text{ (kilo liters/d)} = 100$ $P > 50000$	31623

Factors affecting per capita demand of water consumption:

Size of the city: Per capita demand for big cities is generally large as compared to that for smaller towns as big cities have skewed houses.

Presence of industries.

Climatic conditions.

Habits of people and their economic status.

Quality of water: If water is aesthetically & medically safe, the consumption will increase as people will not resort to private wells, etc.

Pressure in the distribution system.

Efficiency of water works administration: Leaks in water mains and services; and unauthorized use of water can be kept to a minimum by surveys.

Cost of water.

Policy of metering and charging method: Water tax is charged in two different ways: on the basis of meter reading and on the basis of certain fixed monthly rate.

Fluctuations in Rate of Demand

Average Daily per Capita Demand = Quantity Required in 12 Months/ (365 x Population)

If this average demand is supplied at all the times, it will not be sufficient to meet the fluctuations.

Seasonal variation: The demand peaks during summer. Firebreak outs are generally more in summer, increasing demand. So, there is seasonal variation.

Daily variation depends on the activity. People draw out more water on Sundays and Festival days, thus increasing demand on these days.

Hourly variations are very important as they have a wide range. During active household working hours i.e. from six to ten in the morning and four to eight in

the evening, the bulk of the daily requirement is taken. During other hours the requirement is negligible. Moreover, if a fire breaks out, a huge quantity of water is required to be supplied during short duration, necessitating the need for a maximum rate of hourly supply.

So, an adequate quantity of water must be available to meet the peak demand. To meet all the fluctuations, the supply pipes, service reservoirs and distribution pipes must be properly proportioned. The water is supplied by pumping directly and the pumps and distribution system must be designed to meet the peak demand (Astriani, 2016). The effect of monthly variation influences the design of storage reservoirs and the hourly variations influences the design of pumps and service reservoirs. As the population decreases, the fluctuation rate increases.

Maximum daily demand = 1.8 x average daily demand
 Maximum hourly demand of maximum day i.e. Peak demand
 = 1.5 x average hourly demand
 = 1.5 x Maximum daily demand/24
 = 1.5 x (1.8 x average daily demand)/24
 = 2.7 x average daily demand/24
 = 2.7 x annual average hourly demand

Design Periods and Population Forecast

This quantity should be worked out with due provision for the estimated requirements of the future. The future period for which a provision is made in the water supply scheme is known as the design period.

Design period is estimated based on the following:

Useful life of the component, considering obsolescence, wear, tear, etc.

Expandability aspect in the surrounding area.

Anticipated rate of growth of population, including industrial, commercial developments and migration-immigration.

Available resources in and around the campus.

Performance of the system during initial period.

Population density in the organization and its surrounding area

Environmental conditions of AIHM Mumbai

Environmental parameters		
1.	Minimum Temperature	20-25°C
2.	Maximum Temperature	30-35°C
3.	Minimum Relative humidity	66-80%
4.	Maximum Relative humidity	7-100%
5.	Annual Average Rainfall	60-70 cm/avg.year
6.	Annual Average Sunshine	3-6 hrs/avg.day
7.	Wind speed	15.2-17.8 km/hr

Safety measures and Green building conservation code

AIHM Mumbai has very good safety measures as per the Green building conservation code such as fire extinguisher and fire bell and alarms in all the places. In addition, in all the places, 'Exit', 'Entry' and other sign boards kept across the places to give cent percent safety to the stakeholders.

Safety measures made available as per the Green building conservation code at AIHM Mumbai

COVID-19 protocol set-up and Safety measures at AIHM

The Management of AIHM MUMBAI had taken enormous efforts to follow the COVID-19 protocols and made available sanitizers, face masks, towels, dustbins for disposing used face masks across the campus. It is also observed that automatic sanitizer systems are made available at campus to give safety measures against the COVID-19 pandemic situation to the students and both teaching and non-teaching staff members.

Implementing Swachh Bharath Abhiyan Scheme under Clean India Mission

AIHM Mumbai has well developed, Swachh Bharath Abhiyan under Clean India Mission. These bodies are actively involved in tree planting programmes and cleaning the surrounding areas in Mumbai. AIHM Mumbai is conducting a large number of activities to conserve the nature and to teach about the importance of environment to its students.

AIHM Mumbai has taken sufficient attempts to disseminate the green campus motto and green pledge as well as awareness programmes such as 'Don't cut trees', 'Don't use plastic bags', 'Don't waste waters', 'Plastic Free Zones' and 'Preserve the Natural Resources' and etc. among the students and staff members in the campus.

AIHM Mumbai has implemented the Government schemes (Swachh Bharath Abhiyan under Clean India Mission) to give pure and safe water to rural people and teach the importance of cleanliness of toilets and restrooms to people living in Mumbai. These activities are very important in view of the immediate vicinity to take up developmental activities and conducted Participatory rural appraisal programmes. It is involving the socioeconomic status of the inhabitants, natural resources, traditional knowledge systems of people living in Mumbai.

AIHM Mumbai is also focusing on the development of women and youth to identify the extension and training needs of the target group through DLLE. It provides the vocational training to marginal farmers to overcome the problem of seasonal employment.

AIHM Mumbai helps to develop social commitment and to expose the students to get sensitized to social realities and to build a link between the student community and the wider community. It enhances the social interaction, inter-personal communication skills and develop emotional maturity of students. It also helps students in total and integrated personality development. AIHM Mumbai facilitates to prepare the students for future life, by developing qualities such as cooperation, team spirit, leadership, discipline and development of creative talents including to boost the self-confidence of student.

List of Environmental Promotional Activities
Academic Year 2022 -2023

Sr.No.	Date	Title of event	Department
1	26/08/2021	Tree Plantation at college campus	Community Work
2	02/09/2021	Sustainability Awareness Event	Community Work
3	26/09/2021	Environmental Awareness Workshop	Community Work
4	26/07/2021	Swach Sagar	DLLE
5	11/01/2022	Green Marketing trends	B.Sc. HS
6	13/01/2022	Environmental sustainability in Business	B.Sc. HS
7	18/01/2022	Effects of E-Waste on Environment	B.Sc. HS
8	19/01/2022	Session on concept of Green Washing	B.Sc. HS
9	24/01/2022	Session on Green Entrepreneurship	B.Sc. HS
10	25/01/2022	EMS –Environment Management System	B.Sc. HS
11	15/02/2022	Awareness on Trees Plantation and maintenance	B.Sc. HS
12	04/03/2022	Say no to plastic – Awareness and plastic trash picking and disposal activity	B.Sc. HS
13	08/03/2022	Creating sustainable future	B.Sc. HS



**Tree Plantation at College Campus
26/08/21**



**Sustainability Awareness Event
02/09/2021**



**Effects of E-Waste on Environment
18/01/22**



**Environmental Awareness
26/09/2021**



CLEANLINESS DRIVE 26/07/21

SWACHH SAGAR 26/07/21



Environmental sustainability in Business 13/01/22

Green Marketing trends 11/01/22



Session on concept of Green Washing 19/01/22



Session on Green Entrepreneurship Entrepreneurship 24/01/22



EMS –Environment Management System 25/01/22



Awareness on Trees Plantation and maintenance 15/02/22



“Say NO To Plastic” 04/03/22



Say No To Plastic 04/03/22



**Session on creating sustainable future
08/03/22**

Environmental audit is carried out to provide an indication to the Management about how the environmental Organization system is performing. As a result the best practicable means can be applied to preserve air, water, soil, plant and animal life from the adverse effect.

To conclude an environment audit report, the AIIHM Mumbai is an eco-friendly campus and providing pure atmosphere to the stakeholders and supports the nation as a whole in future generations.

Acknowledgement

Quality Care Alliance, Thane, Maharashtra is grateful to the Management and Principal of AIIHM MUMBAI, for providing us necessary facilities and co-operation during the energy audit process. This helped us in making the audit a success. Further, we hope that the best practices on sustainability followed by the Organization and recommendations and suggestions given by the QCA will boost the new generations to take care of the Electrical energy conservation, Energy saving measures and sustainability in compliance with the applicable regulations, policies and standards in AIIHM MUMBAI.

ANNEXURE –CERTIFICATE OF AUDIT



ANNEXURE – CAMPUS PHOTOS





****END OF THE AUDIT REPORT****

THANKS!!!