IARE
INSTITUTE OF
AERONAUTICAL ENGINEERING

STANDARD OPERATING PROCEDURE
FOR
ENVIRONMENT MANAGEMENT SYSTEM

STANDARD OPERATING PROCEDURE FOR ENVIRONMENT MANAGEMENT SYSTEM

Purpose:
To improve environmental performance of the Institution
Environmental Management System (EMS) refers to the management of an organization's environmental programs in a comprehensive, systematic, planned and documented manner. It includes planning, resource development, implementing and maintaining policy for environmental protection.

Scope:
This SOP lays down guidelines to be followed for handling the generated waste such as planning, sensitization of all stakeholders for active participation, segregation of waste as per the norms and treatment in accordance with the principle of 'Refuse, Reuse, Recycle, Recover and Regenerate'(RRRRR) to achieve the goal of Eco-friendly and Eco-Sensitive campus.

1. **Green Campus:** The purpose of green campus is to reduce and control the carbon emission through proper management of spaces by developing and maintaining gardens/trees and their refuse. (Annexure A)

2. **Collection and Segregation and of Generated Waste:** Three type of waste are mainly generated in the institutes viz. electronic waste (e-waste), chemical waste and biomedical waste, along with paper and plant waste. (Annexure B)

3. **Handling Dry Waste:** Dry waste collected from each source will be taken to the processing yard and further segregated as metals, bottles, plastic, etc. The segregated dry waste will be sent to recycling units or sold to agencies handling such materials. After resource recovery level segregation, the residue from the dry waste will be sent for incineration in an eco-friendly incinerator, depending on quantum of waste, can be leveraged for generation of electrical energy by use of some simple technologies.

4. **Handling Wet Waste:** Wet waste aggregated from various sources shall be sent for processing to produce bio-gas through aerobic or anaerobic processes as designated in the plan. It may also be sent for composting via appropriate composting techniques. The success of the campaign is determined by effective segregation of wet waste at source, proper collection/aggregation without mixing and effective treatment. (Annexure C)

5. **Handling of Electronic waste (e-waste):** Electronic waste is generated almost by every department. There should be a provision of collection of e- waste at a designated place in the institute. All the e-waste collected should be audited prior to disposal. (Annexure E)

6. **E-governance:** Staff and students should be educated to minimize the use of paper for all types of communications unless very important. The institutes should instead use e-communication systems such as email and other electronic media for communication.

7. **Bicycle and Pedestrian Master Plan:** Should be drawn by the campus authorities to create a pedestrian-friendly campus that encourages walking and biking.

8. **Energy and Water Efficiency:** Proper operation and maintenance of buildings and grounds improves energy and water efficiency. Proper use of material resources ensures occupant health and well-being at workspaces and residences. Such practices will eventually help attain energy and water efficiency and sustainability. (Annexure F)

9. **Dining Facilities:**
   - Create and implement new products and programs that decrease the waste stream;
   - Minimize food waste at the food preparation and consumption stages;
   - Provide composting and recycling bins in kitchen and seating areas;

- Encourage use of reusable items such as shopping bags, take-out containers, cups and utensils;
- Design and implement programs to channelize food waste during both, food preparation and dining events.

10. **Awareness Generation and Stakeholder Involvement:** Enabling an eco-friendly campus requires effective participation from all the stakeholders. Possible stakeholders are all residents, officials working, visitors, students, maintenance staff and other personnel offering various services on the campus. (Annexure G)

11. **Giving back to Society:** All stakeholders should interact with the society in the surrounding areas. Institute should implement certain socially beneficial ecofriendly activities such as cleanliness drives, tree plantation events, creating water resources, providing alternative sources of energy, adopting a village etc. at least once a year and maintain proper records for the same.

ANNEXURE

ANNEXURE A:
GREEN CAMPUS

Purpose Green campus management is an operational practice developed to control pollutant discharges by using routine maintenance procedures for mowing and debris control.

Maintenance of Garden/Green Area *STEP 1: Plants / Tree Care*

- Regular watering of plants and lawns.
- Pruning of trees and plants / shrubs as and when required. Regular mowing and sweeping of lawn.
- Removal of garden refuse from garden to the designated place. Conversion of garden garbage to compost its use as manure. Encourage plantation of seasonal flowers and trees.

STEP 2: Lawn Care and Signage in Garden Proper maintenance of garden benches, if any. Educate students to respect the utility of the lawns. Classify trees and plants by proper signage.

ANNEXURE B:
COLLECTION AND SEGREGATION AND OF GENERATED WASTE

- Say NO to Plastics: The first and most critical element for success of waste management is the rejection of non-biodegradable materials such as plastic covers and plastic bottles.
- Say Yes to Plastic Alternatives: Instead of plastic, utilize biodegradable materials such as cloth bags, jute baskets, reusable bags, reusable glass bottles etc.
- Process for Replacing Plastic Bottles and Bags:
- Assess the current usage of plastic bottles and bags through a survey form, observation from the collected waste and general usage across the institutions.
- Deliver a one week notice to everyone in the institution to eliminate all their current non-recyclable plastic bottles and bags as well as to ban the carrying of plastic bottles or bags on the campus.
- Arrange collection points at all convenient locations to collect discarded bottles and bags.
- Arrange cloth and paper bag counters across the institution for anyone to purchase if required.
- The Principles of ‘Refuse’ and ‘Reuse’ will be promoted for eliminating usage of plastic in the Institutions.
- All the bags will be checked at the entrances of the Institution for any possible plastic bags or bottles being brought in and have them replaced with paper, cloth or jute bags. Reject any plastic bags being provided and use your own non-plastic bags instead. A handmade paper unit may be setup in the campus for selling paper bags.
- Segregation of Generated Waste: Segregation of the waste at source i.e. primary segregation will be executed at the laboratory, household, hostel kitchen, hostel dining halls, and canteen levels.

- Appropriate bins should be placed at every feasible location in Institutions i.e. wet waste in green bin, recyclable waste in blue bin, and hazardous waste in the red bin. Have a hazardous materials logo on the red bin to prevent its use for disposing e- waste.

ANNEXURE C:

HANDLING WET WASTE:

- Waste, particularly from kitchen, such as vegetable refuses, food scraps, etc. is wet waste. Wet waste is to be sent for composting using aerobic or anaerobic methods.
- Aerobic Method: Windrow composting, vermi-composting, and are some of the popular methods.

ANNEXURE E

HANDLING OF ELECTRONIC WASTE (E-WASTE):

1. **Prepare Material Recovery Facility (MRF)** Each Institution to have one Material Recovery Facility (MRF) where non compostable waste can be temporarily stored in order to facilitate segregation. Sorting and recovery of recyclables from various components of waste by authorized informal sector of waste pickers, recyclers or any other work force should be engaged by the Institution for the purpose before the waste is delivered or taken up for its processing or disposal.
   OR
2. **Extended Producer Responsibility (EPR)** One way is as mooted by the E-Waste Management Rules – 2016 i.e. Extended Producer Responsibility (EPR). Under EPR, manufacturers of computers and other electronic items should take back end of life products.
   If some producers / manufacturers want to appoint a 'Producer Responsibility Organization' which on behalf of manufacturers, collect, dismantle and recycle end-of-life products that can be opted. Institution shall use such facility for the disposal of e-waste.
   OR
3. The e-waste generated should be collected periodically by the institute and should assign the disposal of this waste to a vendor who has specialization in proper disposal of hazardous waste materials.

ANNEXURE F

ENERGY AND WATER EFFICIENCY

A) Building Occupant Behavior

- Turn off laboratory equipment, lights, window air conditioners and/or any other energy consuming equipment when not in use;
- Shut fume hood sashes to appropriate safety levels when not in use;
- Turn off lights and equipment in common areas at the end of the workday and over the weekend;
- Turn off personal computers and equipment at the end of the workday and over the weekend;
- Utilize devices that power down automatically when not in use;
- Close windows and doors of conditioned spaces when the building is heating or cooling;
- Use task lighting and day lighting for rather than overhead lighting whenever possible; and
- The use of personal electric heaters in buildings is prohibited unless authorized by Facilities Operations.

B) Lighting

- Minimize interior and exterior decorative lighting;
- Utilize in-board and out-board switching for lighting fixtures;
- Project design must maximize use of day lighting and day lighting controls; and
- Disconnect all beverage vending machine lamps and specify use of energy saving vending miser devices.

C) Water Efficiency

- Utilize water capturing and/or reuse systems, such as storm water collection and condensate recovery, for non-potable uses;
- Use low water use flush valves and flow restrictors on faucets and showers in shower facilities, labs, and restrooms;
- Do not use single-pass cooling water for mechanical equipment in new construction or remodels;
- Eliminate existing equipment that uses single-pass cooling water systems;
- Renewable Energy
- Should support the development and installation of renewable energy sources on campus.

D) Housekeeping Practices

- Use eco-friendly chemical products that meet or exceed standards set forth by statutory bodies;
- Use cleaning equipment that reduces noise levels, improves overall indoor air quality, and improves worker safety;
- Supplies will be selected to minimize waste at the source, promote use of recycled material, and to allow the materials to be recycled following use;
- Supplies will be selected to reduce the use of potable water;
- Provide on-the-job training for housekeeping to ensure continuous delivery of a clean and healthy environment for building occupants.

ANNEXURE G

AWARENESS GENERATION AND STAKEHOLDER INVOLVEMENT

Depending on the type of stakeholders, appropriate strategy and awareness shall be implemented. The broad steps will be as follows:

- Preparation and display of awareness material, and continuous awareness generation activities for each stakeholder group;
- Launching awareness activities including road shows, skits, posters, pamphlets, group meetings, and assembly announcements, etc.;
- Display adequate sign boards at appropriate locations across the Institution to prompt action and thereby lead to continuous involvement of all the stakeholders for the plan to be successful;
- Continuing activities at regular intervals to drive the focus and keep up the momentum;