

K.L.N. COLLEGE OF ENGINEERING, Pottapalayam
Department of Mechanical Engineering

Title of the Practice: ISHRAE Lab

Objectives of the Practice:

To promote the goals of the Society for the benefit of the general public. Towards this objective, the Chapters of the Society participate in, and organize, activities to protect the Environment, improve Indoor Air Quality, help Energy Conservation, provide continuing education to the Members and others in the HVAC & related user Industries and offer certification programs, career guidance to students at the local colleges and tertiary institutions.

Context:

The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), was founded in 1981 at New Delhi by a group of eminent HVAC&R professionals. ISHRAE today has more than 12,000 HVAC&R professionals as members and additionally there are 7,500 Student-members. ISHRAE operates from 41 Chapters and sub Chapters spread all over India, with HQ in Delhi. It is led by a team of elected officers, who are members of the Society, working on a voluntary basis, and collectively called the Board of Governors.

The practice: (activities carried out)

As part of its objectives to promote the interests of the HVAC&R Industry, ISHRAE is involved in various activities. ISHRAE reaches out to all its members and seeks their active participation & involvement in all the Events/Programs. ISHRAE conducts Conferences, Seminars, Workshops and Exhibitions throughout the country with both national and international participants to discuss, promote and display the state of the art technologies, systems, products and services. ISHRAE organizes ACREX INDIA, the largest international exposition in South Asia on the Air-Conditioning, Refrigeration, Ventilation and Building services industry. Held annually, ACREX is considered to be a major opportunity to showcase the latest technologies / innovations, and provide a platform for buyer- seller meet for technical & commercial personnel in the HVAC& R field. ISHRAE Institute of Excellence (IIE), the educational arm of the Society, is working towards human resource development in the HVAC&R industry in the country by conducting various courses. One of the most important objectives of ISHRAE is Training Programs, and this is attempted at various levels. Right at the apex of the pyramid we have the ICP (ISHRAE Certified Professional) Certification Courses on Clean rooms AC-Design, AC Service and others. At the next level ISHRAE offers a 4-month full time Diploma Course for graduate engineers. In addition at the Chapter level ISHRAE holds several successful training programs, workshops, short term courses, e-learning opportunities & product presentations

No of students/Faculty participated: 60/21

Evidence of Success: (outcome)

ISHRAE promotes research in the field of HVAC&R technology. It offers financial support to Graduate/Post Graduate students, to carry out innovative work on R & D in Technology, Systems, Processes. ISHRAE publications strive to help its members & the industry keep up-to date with the technical developments, latest trends, and sunrise technologies. ISHRAE Standards, Fundamental

books on various topics, HVAC&R Handbooks and the extremely popular & informative ISHRAE Journal, are a few such publications.

At the end of this session, participants will be able to:

1. Identify energy-efficiency considerations for laboratory planning
2. Identify ways to reduce cooling loads with efficient equipment and lighting
3. Describe the process for determining an appropriate airflow to a lab space, and strategies for reducing airflow
4. Summarize options for reducing the energy required for cooling and reheat
5. Understand additional elements of high-performance laboratory design
6. Summarize best practice strategies for achieving energy usage reductions of up to 50%
7. Summarize options to enhance HVAC system performance

Problem encountered:

Assessing HVAC System Cleanliness The lifespan, efficiency and cost-effectiveness of any HVAC system hinge on its state of cleanliness and regular and effective maintenance. HVAC inspectors can objectively determine whether a system is contaminated with a significant accumulation of particulate matter, or if HVAC performance is compromised due to contamination buildup. The inspection process begins when a facility manager, building owner, or another industry related professional (referred to as the ‘client’) contacts an HVAC service provider. Visual inspection of HVAC system components is the first step for the assessment, cleaning, and restoration of HVAC systems. The role of the HVAC assessor is to assess the cleanliness of the HVAC system, which is defined by the presence of dirt, obstructions, excess moisture and microbial contamination that might affect system performance or occupant health and comfort. The inspection involves visual examination of critical HVAC system components using cameras and scopes, where necessary. The inspector (if qualified) also reports observations regarding potential operational malfunctions or other maintenance needs that are observed during the course of the inspection

Resources required:

Labs have high exhaust requirements and large equipment loads, contributing to energy usage intensities five to ten times those of typical office buildings. Facilities in hot and humid climates face special challenges: most hours of the year require cooling, and 100% outside air systems have large latent energy loads. Air handling systems usually account for the largest amount of energy usage in a lab and are therefore the most important component of an energy-efficient system. First, airflow should be reduced as much as possible. Strategies such as reducing cooling loads in the space, reducing the air exhausted by fume hoods and other exhaust sources, and reducing the required air change rate of the space



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Title of the Practice: E-Yantra Lab sponsored by IIT-Bombay

Objectives of the Practice:

To provide hands-on learning to engineering students who have limited access to labs and mentors. The goal is to create the next generation of (Embedded systems) engineers in India with a practical outlook to take on challenging problems and provide solutions.

Context:

E-Yantra is an initiative to spread education in Embedded systems and Robotics by IIT Bombay sponsored by Ministry of Human Resource Development through the National Mission on Education through ICT (NMEICT). E-Yantra Lab Setup Initiative (eLSI) supports the infrastructure creation at colleges by providing a platform for training teachers both in theory and applications of Robotics, in addition to providing guidance in setting up a Robotics lab at the college. ELSI aims to enable colleges to teach Robotics and Embedded systems in an effective manner.

The practice: (activities carried out)

- Training teams of 4 teachers from colleges in a region, in the basics of embedded systems theory and Micro-controller programming through a 2-day workshop.
- Engaging the teams through Task based Training (TBT) – where teachers are trained to implement various experiments on the robot over a period of three/four months. Each college team is given a Robotic kit complete with tutorials and accessories and is taken step-by-step through hands-on training by the e-Yantra team.
- Providing support and advice to set up a Robotics lab so that by the time the teachers are trained, the lab is ready at the college for the teachers to get their students involved through projects.

No of students/Faculty participated:

Four Faculty & 40 students from various departments.

Evidence of Success: (outcome)

Our team initiate small step and contribute the greater efforts to successfully completed Task Based Training (TBT) and got certificates from IIT-Bombay. We have submitted four project ideas in e-yantra portal, two of them were selected for next round.

Problem encountered:

The most difficult challenge faced is usually reaching out to students concentrate on their academic and social media, who prove to be resistant to any kind of help. However, there is a big scope for their future.

Resources required:

Our college initiative and IIT-Bombay have given four robotic kits with tutorials and accessories to taken up step-by-step process through hands-on training to the staffs and students to finish their tasks.