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CCE Career Advancement Program | IISc – ISHRAE Training Program

Development of CO_2 and Hydrocarbon-based Sustainable Cooling and Heating Systems

Course Date:
7th to 9th December 2026

Course Schedule:
8:30 AM – 4:30 PM

Venue:
Interdisciplinary Centre for Energy Research, IISc

Organizing Faculty
Prof. Pramod Kumar, ICER, IISc
Prof. R. Saravanan, President, ISHRAE

Course Co-ordinators
K. N. Vasista, Vijay Biradar, Himanshu Rao, IISc

Industry Co-ordinator
Sandeep Lokare, ISHRAE



Scan for Location

Course Fee per participant: *INR 30,000 + 18% GST (non refundable)*
Course Mode: In-person / Classroom (ICER, IISc Bengaluru)
Minimum Qualifications: *B.E (Any Discipline), Diploma (with domain experience)*
Accommodation: *Available on first come first serve basis (subsidized)*
Maximum Bach Size: 30
Professional Training Certificate will be provided to all participants

**1) Attendance in All Sessions is compulsory to obtain a certificate*
2) Fees does not include accommodation, covers all course materials incl. lunch and breakfast

FOR FURTHER DETAILS, CONTACT

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More Details: https://cce.iisc.ac.in/short-term/

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	Day-1	Day-2	Day-3
Timing	**Topics**		
8:30–10:00 am	Review of Thermodynamic Principles- Refrigeration and Heat Pump Cycles	Principles of CO_2 Heat Pump Design	Hydrocarbon Heat Pump System Configuration and Analysis
10:00–10:15 am	Tea/Coffee Break		
10:15–11:30 am	Review of Heat Transfer Principles	Principles of CO_2 Heat Pump Design	Hydrocarbon Heat Pump System Configuration and Analysis
11:30 am–12:45 pm	International Regulations & Refrigerant Evolution		
12:45–1:30 pm	Lunch Break		
1:30–3:00 pm	Introduction to CO_2 (R744) and Hydrocarbons as Refrigerants	CO_2 Refrigeration and Heat Pump System Configuration and Analysis	Visit to TCO_2 systems at IISc
3:00–3:15 pm	Tea/Coffee Break		
3:15–4:30 pm	Criteria for Selection of Refrigerants Based on the Application	CO2 Refrigeration and Heat Pump System Configuration and Analysis	Feedback and Discussions

Course Overview: As industries transition to low-carbon cooling technologies, natural refrigerants are becoming the preferred choice for refrigeration and heat pump applications. Designed specifically for practicing HVAC and refrigeration engineers, this program provides a practical introduction to CO_2 (R744) and hydrocarbon refrigerants, covering their applications, benefits, and implementation challenges.

Course Structure: The course covers natural refrigerant fundamentals, refrigeration cycles, system configurations, key equipment, safety, operation, maintenance, and performance optimization. Learning is reinforced through practical examples and industry case studies from commercial refrigeration, cold storage, industrial cooling, and heat pump applications.

Learning Outcomes: Upon completion of the program, participants will gain a practical understanding of CO_2 and hydrocarbon-based refrigeration and heat pump systems, enabling them to evaluate system operation, efficiency, reliability, and safety. They will also develop the ability to identify common operational issues, assess opportunities for performance improvement, and understand the role of natural refrigerants in delivering sustainable cooling and heating solutions.

Course Material: Participants will receive course materials and handouts for each session. Please bring your own laptop with MS Office installed.

Prerequisite: Basic knowledge of mechanical engineering, especially refrigeration and HVAC, will be useful. No programming experience is needed.

Note: Physical Attendance is compulsory in all sessions for obtaining a course completion certificate.