



ENGINEERING
TOMORROW

Danfoss

IISc-Danfoss Training Program On Design and Development of CO₂ based Refrigeration and Heat Pump Systems

Course Date:

26th February to 1st March 2024

Course Timings:

M-F: 10:00 am – 5:00 pm

Faculty Co-ordinator

Prof. Pramod Kumar, ICER, IISc

Industry Co-ordinator

Dr. Kundan Kumar, Danfoss India



Course Fee per participant: **INR 50,000 + 18% GST**

Accommodation: INR 1000/- per participant on first come first serve basis at CCE guest house (Breakfast & Dinner not Included)

Fees are non-refundable due to limited number of participants

Minimum Qualifications: B.E (Any Discipline)

Batch Size: 20

Course Mode: Offline (CCE Classroom, IISc Bengaluru)

Attendance in all sessions is compulsory for obtaining a participation certificate

Course completion certificate will be provided to all participants who clear the assessments

Contact Us:

Centre for Continuing Education (CCE)
Indian Institute of Science
Bengaluru-560012, INDIA
Phone: +91 080 2293 2055/2491/2247

Scan to Register Online



More Details: <http://cce.iisc.ac.in/ssp-stc.html>



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	Day-1	Day-2	Day-3	Day-4	Day-5
Timing	Topics				
10:00 am	Familiarization, Program Overview & Review of thermodynamic principles applied to refrigeration systems	Historical perspective, Refrigerant & Evolution of refrigerants	Design of CO ₂ booster and Parallel compression systems	Introduction to CO ₂ /Ammonia cascade systems	Heat exchanger selection & sizing/Visit to CO ₂ heat pump demo site
11:30 am	Tea/Coffee Break				
11:45 am	Overview of refrigeration systems	Protocols and Policies	Design & selection of Ejector based systems	Design of pump circulation CO ₂ /Ammonia cascade systems	Instrumentation & controls for CO ₂ systems
1:15 pm	Lunch Break				
1:45 pm	Design of refrigeration systems	Introduction to CO ₂ as a refrigerant	Safety measures for CO ₂ systems & Case studies	Safety and control of CO ₂ /Ammonia cascade systems	Good design practices and maintenance of the CO ₂ systems
3:15 pm	Tea/Coffee Break				
3:30-5:00 pm	Tutorials, quizzes, hands-on training and assessments				Feedback and Discussions

Course Overview

The IISc-Danfoss Training Program on “Design and Development of CO₂-based Refrigeration and Heat Pump Systems” has been specifically tailored for practicing HVAC and refrigeration engineers to familiarize them with CO₂ based refrigeration systems. Different modules in the course are specifically curated to cover various aspects of design starting from fundamental concepts of thermodynamics, heat transfer, and refrigeration cycles to hands-on design and best practices used in HVAC industry. The curriculum is expected to bridge the gap between theory and practice. Emphasis is given on simple paper and pencil based design to comprehensive system evaluation using computer-based tools. Specific attention to heat exchanger sizing, compressor selection, and control system design is provided to ensure fail-safe operation. Case studies showcasing best practices used in hardware/software interlocks, control wiring, and skid development will be presented. It is expected that upon successful completion of the course, the participant will be in a position to size, design, troubleshoot, and evaluate the performance of a standalone CO₂ or CO₂/NH₃ cascade systems.

Course Format: The format typically includes a morning session dedicated to theory, followed by hands-on training and system design including Q&A in the afternoon session. The course is structured such that no subject matter pre-requisites are required. However, working knowledge of MS Excel would be helpful.

Course Material: Participants will receive session wise course materials, handouts, and booklets required for each module. All Participants are required to carry their own laptops with MS Office pre-installed.

Pre-requisite: Basic knowledge of Mechanical Engineering, particularly related to refrigeration and HVAC applications. No prior knowledge of computer programming is necessary.

Note: Completion Certificates will be issued to only those who successfully clear the assessments. No grades/marks will be allotted. Participation certificates will be issued to all participants.