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CERTIFIED HVAC DESIGNER CHD OVERVIEW

ONLINE PROFESSIONAL COURSES LED BY THE
WORLD'S TOP SPECIALISTS

ONLINE TRAINING BY KRISHNAJI PAWAR

LEED AP(BD+C), GSAS CGP, GCP, ISO 14001

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MODULE

1

Introduction and Course Outline

KRISHNAJI PAWAR - CEO & FOUNDER

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CERTIFIED HVAC DESIGNER - CHD OVERVIEW

The Certified HVAC Designer (CHD) Overview training program teaches participants to design foundational HVAC systems for building or project requirements, covering ducts, zoning plans, control sequences, air diffusion, and integrating technologies.



BRIEF ABOUT ME

Krishnaji PAWAR

CEO & FOUNDER

Krishnaji Pawar is founder and CEO of Beyond Smart Cities. Before being named CEO in January 2020, Krishnaji held leadership roles at Beyond Smart Cities in both Sustainability ,Energy & Environmental Consultancy.

Specialized in developing sustainable design strategies for Green Building Certification Systems (LEED, GSAS, etc.), Energy & Water Conservation, Commissioning, Environmental Impact Assessment & Environmental Management Systems.

Currently responsible for 3,787 million square feet Green Building /Energy modeling Consulting since January 2008 in UAE, India and Qatar.



Learning Objectives

- **Introduction**
- **HVAC Fundamentals**
- **The Air-Conditioning Process**
- **HVAC System Concepts and Process**
- **HVAC Systems Design**
- **Engineering, Economics, and Design Decision-Making**
- **Certified HVAC Designer (CHD) Specialty Certification**
- **Summary and Resources**
- **Certified HVAC Designer - CHD Practice Test V.4.1**



INTRODUCTION

- A prestigious designation awarded by ASHRAE to recognize professionals in HVAC system design.
- Crucial in ensuring systems meet performance specifications, safety, sustainability, and regulatory standards.
- Validates competence in HVAC system design, load calculations, equipment selection, code compliance, and sustainability practices.
- Serves as professional credibility, quality assurance, analogy, and regulatory compliance.
- Eligibility criteria and successful examination are required.
- Continuing education and recertification are essential for maintaining the CHD designation.
- The CHD designation sets a benchmark for professional excellence and fosters a culture of continuous improvement.
- Certified professionals contribute significantly to enhancing the built environment, ensuring occupant satisfaction and environmental responsibility.

CERTIFIED HVAC DESIGNER OVERVIEW TRAINING PROGRAM



- Teaches foundational HVAC systems for building or project requirements.
- Verifies individual's ability to design HVAC systems that align with building or project requirements.
- Includes load calculations, equipment selection and sizing, mechanical equipment room design, duct and piping layout, and HVAC plan development.
- Validates competency in system design, design calculations, procedural, and coordination.
- In line with ISO/IEC 17024 standards, shows knowledge in designing HVAC systems.
- Responsible for managing building modifications, calculating heat loss, and determining ventilation rate requirements.
- Develops HVAC systems, prepares flow diagrams, schematics, plan drawings, and reviews shop drawings.

MODERN AIR CONDITIONING: A CENTURY-LONG JOURNEY



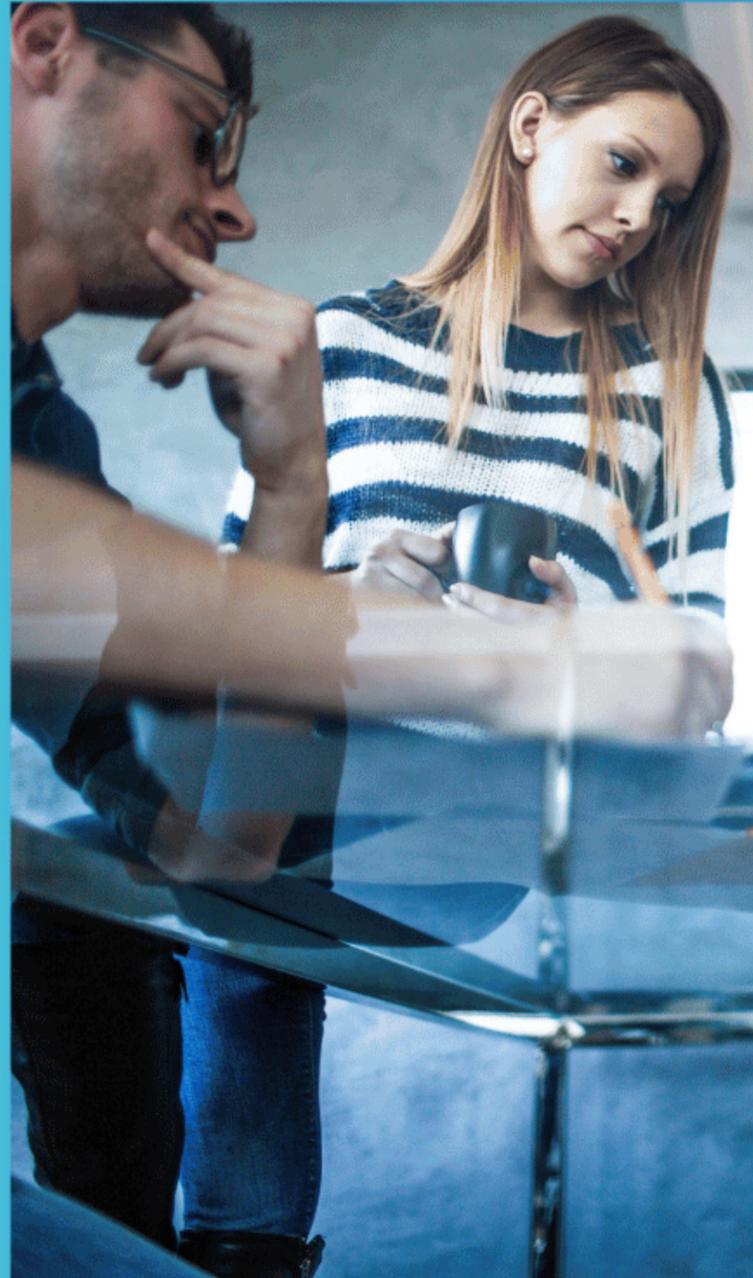
- Hermann Rietschel, Alfred Wolff, Stuart Cramer, and Willis Carrier contributed to the development of modern air conditioning.
- Cramer, a textile engineer, coined the term "air-conditioning" in 1906.
- Willis Carrier integrated scientific method, engineering, and business, creating the HVAC industry.
- By 1929, ASHRAE defined comfort air-conditioning as controlling temperature, humidity, cleanliness, and distribution of air.
- The term is still used today, but has undergone significant refinements since 1929.

WHO ARE THE CERTIFIED HVAC DESIGN PROFESSIONALS?

- HVAC Engineering Professionals: Enhancing knowledge and skills in HVAC system design.
- Building Design Professionals: Optimizing HVAC systems for energy efficiency and sustainability.
- Students and Graduates: Strengthening understanding of practical HVAC applications and preparing for certification exams.



HVAC DESIGN PROFESSIONAL ROLES AND RESPONSIBILITIES



- Design HVAC systems to meet specific building requirements.
- Balancing efficiency, cost, and reliability.
- Complying with local, state, and national codes and standards.
- Implementing energy efficiency regulations like ASHRAE 90.1 or IECC.
- Adhering to indoor air quality standards set by EPA and ANSI.
- Collaborating with architects and builders for seamless integration of HVAC systems.
- Overseeing project management roles including budgeting, timeline management, and quality control.

CERTIFIED HVAC DESIGNER (CHD) EXAMINATION PROCESS

Eligibility Criteria

- Candidates must have at least four years of HVAC industry work experience.
- A combination of education and experience may be considered.
- Fundamental understanding of HVAC system components.

Examination Overview

- Assesses knowledge across various HVAC design topics.
- Multiple-choice questions test both theoretical knowledge and practical application.

Preparation Resources

- ASHRAE publications and standards, industry-specific textbooks, and continuing education courses are recommended.



CHD KNOWLEDGE DOMAINS

- Fundamental HVAC Principles: Understanding of thermodynamics, fluid mechanics, and heat transfer principles.
- Load Calculations: Analyzing factors such as building orientation, climatic conditions, and internal heat gains.
- Equipment Selection: Understanding the specifications, capabilities, and efficiencies of various systems.
- System Design and Layout: Arrangement of ductwork, piping, and equipment to optimize airflow and energy efficiency.

Impact of Certification

- Professional Development: Provides access to advanced career prospects in HVAC design and engineering.
- Industry Standards and Best Practices: Certified professionals are more likely to implement energy-efficient solutions.
- Contribution to Sustainability: Certified HVAC Designers contribute significantly to energy conservation and environmental stewardship.



HVAC SYSTEMS IN MODERN BUILDING DESIGN

- HVAC systems control temperature, humidity, and air quality to maintain indoor environmental quality.
- They work with the building envelope and other mechanical systems for a comfortable indoor environment.
- HVAC comprises three primary functions: heating, ventilation, and air conditioning.
- Heating systems use furnaces, heat pumps, and electric resistance heating.
- Ventilation is crucial for maintaining indoor air quality and removing contaminants. Building codes and standards guide ventilation rates.
- Air conditioning systems cool indoor spaces by removing heat and humidity.
- Modern HVAC systems use Building Automation Systems (BAS) for centralized monitoring and control of HVAC equipment.
- Advancements in HVAC technology are vital for creating sustainable and comfortable indoor environments.





WELCOME TO BEYOND SMART CITIES

Beyond Smart Cities is the world's 1st Green Technology Marketplace, connecting millions of Sustainability Specialists, Green Building Specialists, Energy Specialists, Commissioning Specialists, Environment Specialists, Health & Safety Specialists, Fire Safety Specialists, Climate Change Specialists & Green Products/Technology Manufacturers with independent talent around the globe.

Our mission is to build and support a global community of experts with the highest professional standards in sustainability, green building, energy, commissioning, environment, health & safety, fire safety, climate change, GHG accounting, carbon auditing, and GHG emissions management.

KEY TERMINOLOGY IN HVAC SYSTEMS

Definition of HVAC Systems

- Heating: The process of raising a space's temperature to create a comfortable indoor environment.
- Ventilation: The process of exchanging indoor air with outdoor air to maintain indoor air quality.
- Air Conditioning: The process of cooling and dehumidifying indoor air.



KEY COMPONENTS OF HVAC SYSTEMS +

- Thermostat: A device that measures a space's temperature and controls the HVAC system to maintain a desired setpoint.
- Ductwork: A system of conduits that distributes heated or cooled air throughout a building.
- Refrigerant: Fluids used in air conditioning and refrigeration systems to absorb and release heat.
- Heat Exchanger: A device that transfers heat between two or more fluids without mixing them.



PERFORMANCE METRICS +

- Seasonal Energy Efficiency Ratio (SEER): Measures the cooling efficiency of air conditioning systems.
- Heating Seasonal Performance Factor (HSPF): An efficiency metric for heat pumps.
- Coefficient of Performance (COP): Measures the efficiency of heating and cooling devices.



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Baseline model : the set of arithmetic factors, equations, or data used to describe the relationship between energy use or demand and other baseline data. A model may also be a simulation process involving a specified simulation engine and set of input data

Boundary conditions :physical conditions (values of physical quantities, conditions of energy interchange, etc.) imposed upon a system at the start or end of a process (temporal boundary conditions) and/or at the boundaries separating the system from its surroundings (local boundary conditions)

Building envelope : (1) outer elements of a building, including walls, windows, doors, roofs, and floors, including those in contact with earth. (2) the exterior plus the semi-exterior portions of a building. For the purposes of determining building envelope requirements, the classifications are defined as follows. Building envelope, exterior: the elements of a building that separate conditioned spaces from the exterior. Building envelope, semi-exterior: the elements of a building that separate conditioned space from unconditioned space or that enclose semiheated spaces through which thermal energy may be transferred to or from the exterior, to or from unconditioned spaces, or to or from conditioned spaces

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THANK YOU

