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HIGH-PERFORMANCE BUILDING DESIGN PROFESSIONAL - HBDP 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
7

Certification for High-Performing Building Specialists

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HIGH-PERFORMANCE BUILDING DESIGN PROFESSIONAL HBDP OVERVIEW

ASHRAE, an international organization, promotes the advancement of heating, ventilation, air conditioning, and refrigeration, with the Building Energy Modeling Professional certification program validating job competency in recognized technical information.

Learning Objectives

- Introduction
- Getting Started with HBDP
- Sustainability Concepts
- HVAC Processes
- Sustainable Processes
- Environmental Improvement Programs and Rating Systems
- **Certification for High-Performing Building Specialists**
- Summary and Resources
- High-Performance Building Design Professional - HBDP Practice Test V.4.1



INTRODUCTION

- High-performing buildings are those that maximize energy efficiency, minimize environmental impact, and provide a healthy indoor environment.
- Certification for high-performing building specialists is a formal recognition of an individual's expertise in designing, constructing, and operating high-performing buildings.
- Validates competency in designing sustainable HVAC&R systems.
- Covers energy analysis, indoor/site environment, controls, monitoring, benchmarking, water conservation, sustainable construction commissioning, energy/materials use/management.

ASHRAE'S HIGH-PERFORMANCE BUILDING DESIGN PROFESSIONAL (HBDP) CERTIFICATION PROGRAM

- ASHRAE is an international organization dedicated to advancing heating, ventilation, air conditioning, and refrigeration.
- The HBDP certification program validates job competency in internationally recognized technical information.
- HBDP is the top credential among all ASHRAE certifications.
- It demonstrates high competencies in HVAC systems, water conservation, materials management, energy efficiency, zero-energy approaches, building commissioning, operation, maintenance, and control systems related to high-performance sustainable and green buildings.



WHAT IS CERTIFICATION FOR HIGH-PERFORMING BUILDING SPECIALISTS?

- Certification signifies that an individual has met standards of excellence in the field of high-performance building design and construction.
- It ensures that buildings are designed and constructed in a way that maximizes energy efficiency and minimizes environmental impact.
- It provides a way for building owners, developers, and other stakeholders to identify professionals with the expertise needed to deliver high-performing buildings



HOW TO BECOME CERTIFIED:

- Eligibility requirements include a certain level of education and professional experience.
- Candidates must pass a comprehensive examination testing their knowledge of high-performance building design and construction principles.
- Some certification programs may require candidates to complete a certain number of hours of continuing education or professional development activities to maintain their certification.





I. BACKGROUND INFORMATION	6	10	2	18
A. Sustainability Concepts	3	3	0	6
1. Define energy efficiency concepts.				
2. Explain the following:				
a. commissioning (e.g., owner's-project requirements, commissioning process, measurement and verification, retrocommissioning).				
b. the design process (e.g., integration, team formation, team dynamics, documentation requirements, building information modeling).				
c. water usage efficiency.				
d. environmental impact (e.g., emissions, solid and fluid waste disposal).				
3. Demonstrate indoor environmental quality elements (e.g., thermal comfort parameters, ventilation, acoustics, chemical and human pollutants, lighting, biological contaminants).				
4. Analyze the building envelope.				
5. Consider capital equipment options.				
6. Define net-zero energy building concepts.				
7. Understand the definition of life cycle analysis:				
a. explain life cycle.				
b. identify benefits and limitations of analysis methods.				
B. HVAC Processes	3	2	0	5
1. Obtain the owner's project requirements (OPR).				
2. Identify and evaluate alternative systems:				
a. selection.				
b. optimization.				
c. operability.				
d. maintainability.				
3. Comply with codes and standards in the design and construction documents.				
4. Utilize incentives offered, as applicable.				
5. Design hydronic and air distribution systems to minimize energy consumption.				
B. Sustainable Processes	0	4	2	6
1. Utilization of natural resources.				
2. Analyze alternative/renewable energy sources:				
a. solar assisted DHW heating.				
b. photovoltaic.				
c. air to water heat pumps.				
d. air to air heat pumps.				
e. ground source heat pumps.				
3. Evaluate feasibility/options for a net-zero energy building.				
4. Explain implications of siting.				
C. Environmental Improvement Programs and Rating Systems	0	1	0	1
1. Advise customers on available programs and systems.				
2. Distinguish among programs and systems (pros, cons, costs).				



II. ENERGY ANALYSIS	6	8	8	22
A. Envelope / Massing / Orientation Optimization	0	2	2	4
1. Perform tradeoffs on the cost/benefit of alternatives.				
2. Determine the impact of climate on design.				
3. Analyze thermal mass effect.				
4. Analyze effect of envelope decisions on building pressurization.				
B. Initial Assessment	2	2	2	6
1. Identify facility parameters.				
2. Calculate preliminary building loads.				
3. Determine alternative system concepts.				
4. Identify interrelated processes and systems, and perform synergy analysis.				
5. Analyze energy consumption for different options (e.g., modeling).				
6. Compare alternative systems.				
C. Ventilation	2	2	4	8
1. Natural:				
a. analyze benefits and consequences of alternatives.				
b. apply thermal gradient theories (e.g., stack effect, buoyancy).				
2. Mechanical:				
a. analyze benefits and consequences of alternatives.				
b. optimize zone loading with the mechanical system.				
3. Integrate natural and mechanical ventilation into hybrid systems.				
4. Identify key reference documents.				
5. Determine appropriate energy recovery methods.				
6. Assess cross contamination risk.				
C. Energy Compliance Modeling	2	2	0	4
1. Apply modeling techniques to predict the following with respect to established targets:				
a. code compliance.				
b. energy consumption.				
c. emissions impact.				
2. Distinguish among modeling techniques.				
3. Define energy modeling limitations and alternative calculation methods.				



III. INDOOR and SITE ENVIRONMENT	6	7	4	17
A. Thermal Comfort	1	4	2	7
1. Identify:				
a. comfort variables that affect the occupant (e.g., operative temperature, clo value, metabolic rate).				
b. key reference documents.				
c. thermal comfort requirements of individuals and groups.				
2. Zone the building and determine building pressurization requirements to optimize comfort and energy efficiency.				
3. Plan individual control and zoning strategies.				
B. Air Quality	3	2	1	6
1. Control indoor air contaminants/pollutants.				
2. Identify outdoor air ventilation requirements.				
3. Analyze air quality strategies.				
4. Recognize applications requiring governmental and regulatory codes.				
5. Recognize impact of external environment.				
D. Lighting	2	1	1	4
1. Integrate the occupant's mission with lighting requirements.				
2. Analyze visual quality of the lighted space.				
3. Integrate daylighting and lighting.				
4. Assess site lighting goals.				



IV. CONTROLS and MONITORING	5	7	2	14
A. Control Hardware	2	1	0	3
1. Establish sensors, instrumentation, and calibration requirements.				
2. Define the control functions of the equipment.				
3. Determine the need for central monitoring and control such as:				
a. trending (logging intervals, storage capacity).				
b. alarms.				
c. remote access.				
B. Control Strategies	3	6	2	11
1. Establish control sequences that meet the owner's objectives.				
2. Integrate controls with equipment and systems.				
3. Instruct building operators in system functions.				
4. Establish:				
a. operator training requirements.				
b. operating and maintenance procedures.				
c. reporting requirements.				
5. Incorporate energy reporting capabilities.				
6. Optimize control sequences for energy conservation.				

V. BENCHMARKING WITH PERFORMANCE METRICS	1	4	2	7
B. Project Performance Measurement	0	1	0	1
1. Assess the efficiency of information transfer on high-performance requirements.				
2. Assess financial and time impact of implementing sustainable principles.				
C. Energy Performance Verification	1	2	1	4
1. Measure the performance of a building.				
2. Normalize performance data and trends.				
3. Compare the performance of a building against:				
a. projections.				
b. similar buildings.				
D. Environmental Performance Measurement	0	1	1	2
1. Compare emissions measures to goals.				
2. Compare utility consumption to goals.				
3. Compare occupant satisfaction measures to goals.				





VII. COMMISSIONING IN SUSTAINABLE CONSTRUCTION	3	3	1	7
H. Documentation	2	1	0	3
1. Identify unique requirements for sustainable construction.				
2. Determine the owner's objectives and criteria.				
3. Define commissioning scope.				
4. Specify systems and operations.				
5. Identify the sequence of operations.				
I. Commissioning Process	1	2	1	4
1. Integrate quality control into design and construction.				
2. Verify quality assurance in design and construction.				
3. Evaluate post-occupancy performance.				
4. Develop a feedback/corrective action methodology.				
5. Implement corrective actions (e.g., recommissioning, retrocommissioning).				
I. ENERGY and MATERIALS USE and MANAGEMENT	4	3	0	7
1. Encourage the owner to hire an energy manager.				
2. Identify needed competencies of staff who will service a building.				
3. Implement a maintenance plan.				
4. Recommend sustainable practices for:				
a. housekeeping and site management.				
b. renovation projects.				
Totals	34	46	20	100

HBDP EXAM PREPARATION RESOURCES

- Practice Exam: ASHRAE HBDP Practice Exam.
- Design Guides: ASHRAE GreenGuide, Advanced Energy Design Guide for Small to Medium Office and Small Retail Buildings.
- Standards and Guidelines: ASHRAE Standard 55, ANSI/ASHRAE 62.1, ANSI/ASHRAE/IESNA Standard 90.1 (I-P), ANSI/ASHRAE/IESNA Standard 90.2, ANSI/ASHRAE/USGBC/IES Standard 189.1, ASHRAE Guideline 0: Commissioning Process, ASHRAE Guideline 1.1, ASHRAE Guideline 4: Preparation of Operating and Maintenance Documentation for Building Systems, ASHRAE Guideline 14: Measurement of Energy and Demand Savings.
- ASHRAE e-Learning: Fundamentals of ANSI/ASHRAE/IESNA Standard 90.1, ASHRAE Learning Institute, and Fundamentals of Sustainable Buildings and High Performance Systems Design (GREENGUIDE).





HIGH-PERFORMANCE BUILDING DESIGN PROFESSIONAL - ASHRAE

- Enhances reputation and career opportunities.
- Demonstrates competency in critical high-performance building design knowledge.
- Ensures fairness and validity through ANSI National Accreditation Board (ANAB) accredited personnel certification program.
- Skills include analyzing renewable energy sources, air quality strategies, energy compliance modeling, water reduction, O&M procedures, and HVAC systems.
- Includes implementing maintenance plans, commissioning processes, and integrating controls with equipment and systems.

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