

## Appendix A-Detailed Content Outline

Healthcare Facilities Design Professional Certification Examination Content Outline	Complexity Level and Number of Items			
	Recall	Application	Analysis	TOTALS
<b>I. MEDICAL BACKGROUND INFORMATION</b>	<b>6</b>	<b>8</b>	<b>0</b>	<b>14</b>
<b>A. Terminology</b>				
1. Recognize relevant medical terms (e.g., immune compromise).				
2. Demonstrate understanding of various healthcare occupancy types.				
<b>B. Equipment</b>				
1. Describe relationship of medical equipment to HVAC design.				
2. Identify basic medical equipment.				
<b>C. Departments and Medical Procedures</b>				
1. Apply understanding of medical procedures to room designs.				
2. Apply HVAC design to medical functional areas.				
<b>D. Airborne vs. Contact Infection and Contamination</b>				
1. Distinguish between airborne and contact transmission of pathogens.				
2. Demonstrate understanding of transmission, infection, and diseases.				
<b>E. Common Disease Organisms</b>				
1. Describe conditions of growth of disease organisms.				
<b>F. Contamination of Domestic Water Supply</b>				
1. Evaluate conditions under which pathogens grow.				
2. Describe known amplification sites for pathogens.				
3. Identify control methods for limiting pathogen growth.				
<b>II. STANDARDS and GUIDELINES for HVAC SYSTEM DESIGN for HEALTHCARE FACILITIES</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>17</b>
<b>A. Standards and Guidelines</b>				
1. Recognize common standards from ASHRAE.	●	●	●	●
2. Recognize common guidelines.	●	●	●	●
3. Recognize the requirements of the appropriate accreditation organization.				
<b>B. Regulatory Codes</b>				
1. Demonstrate understanding of ASHRAE energy code requirements.				
2. Recognize the requirements of local authorities and the effect on design.				

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<b>III. HVAC SYSTEM DESIGN for HEALTHCARE FACILITIES</b>	<b>7</b>	<b>21</b>	<b>7</b>	<b>35</b>
<b>A. Static Pressure Control</b>				
1. Identify types of rooms that require static pressure control.				
2. Apply methods to accomplish static pressure control.				
3. Describe methods for measurement, notification, and documentation of static pressure control.				
<b>A. Energy Efficiency</b>				
1. Determine inefficiencies in healthcare system design.				
2. Apply aspects of energy efficiency specific to healthcare.				
3. Describe exemptions from the energy standard.				
4. Demonstrate knowledge of limitations of energy saving strategies.				
5. Demonstrate understanding of variable volume system application.				
6. Demonstrate knowledge of energy use and management.				
7. Articulate energy recovery technologies.				
<b>C. Room Air Distribution</b>				
1. Design systems with proper air flows and pressurizations.	●	●	●	●
2. Calculate air flow rates to comply with room air change rates.				
3. Demonstrate understanding of the fundamentals of diffuser placement.				
4. Diagnose improper room air distribution and pressurization.	●	●	●	●
5. Describe psychometric sensor placement.				
<b>D. Equipment and Application</b>				
1. Demonstrate knowledge of air handling systems design.				
2. Identify security concerns related to HVAC.				
3. Locate equipment.				
4. Demonstrate knowledge of psychometric principles.				
<b>IV. UNIQUE REQUIREMENTS for HEALTHCARE FACILITIES</b>	<b>14</b>	<b>20</b>	<b>0</b>	<b>34</b>
<b>A. Central Plants - Describe need for redundancy to current standards.</b>				
<b>B. Medical Equipment</b>				
1. Demonstrate understanding of contribution to loads.				
2. Demonstrate understanding of special HVAC requirements.				
3. Describe major diagnostic and treatment equipment.				
4. Describe application of sterilizers.				

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<b>C. Fire and Life Safety</b> (including smoke control)				
1. Describe smoke management requirements for healthcare facilities (e.g., OR and patient room).				
2. Demonstrate understanding of ventilation system requirements for medical gas storage areas.				
3. Demonstrate understanding of healthcare facility compartmentalization.				
<b>D. Operations and Maintenance</b>				
1. Maintain equipment accessibility.				
2. Maintain functionality during maintenance.				
3. Demonstrate understanding of healthcare facility operations.				
4. Describe consequences of continuity of service.				
5. Prescribe procedures for abnormal operation conditions.				
<b>E. Infection Control</b>				
1. Describe the primary elements of an ICRA process.	●	●	●	●
2. Describe the role of the HVAC designer in the ICRA process.				
3. Demonstrate understanding of how the ICRA affects mechanical specifications.				
4. Demonstrate understanding of the various ICRA engineering controls used during construction.				
5. Demonstrate understanding of contamination control.				
6. Describe strategies for epidemiology related to HVAC.				
<b>F. Disaster Mitigation, Management, and Recovery</b>				
1. Demonstrate understanding of design contingencies following utility system failure.				
2. Evaluate needs following catastrophic events.				
3. Demonstrate understanding of current literature.				
4. Demonstrate understanding of hazard vulnerability analysis.				
<b>G. Controls and Instrumentation</b>				
1. Demonstrate understanding of HVAC system monitoring strategies.	●	●	●	●
2. Demonstrate understanding of room pressure controls.				
3. Monitor mechanical, electrical, and fire shut down controls.				
4. Monitor temperature and humidity controls.				

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<b>H. Testing, Balancing, and Commissioning</b>				
1. Demonstrate understanding of existing conditions prior to renovation.				
2. Recognize performance metrics of commissioning.				
3. Describe test procedures for commissioning various areas requiring unique pressure relationships.				
4. Demonstrate understanding of various control sequences.				
<b>Totals</b>	<b>44</b>	<b>49</b>	<b>7</b>	<b>100</b>