Facility Systems Management: HVAC, Electrical, and Building Automation

Learn to integrate and manage key building systems for improved efficiency and cost savings. Designed for facility managers, engineers, and technicians.

Facility Systems Management Instructor: Robert Hayes • 5 sections • 46 lessons • 18.00h total

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About this course

Modern buildings often have HVAC, electrical, and automation systems that operate separately, causing energy waste, higher costs, and maintenance headaches. This course shows you how to bring these systems together for better performance and sustainability. You'll learn through video lectures, case studies from real facilities, and hands-on examples that cover everything from basics to advanced strategies.

Course curriculum

Foundations and Preparation

- Introduction to Facility Systems Management (12m)
  Overview of the course and why integrated systems are essential for efficient building operations.
- Basics of HVAC Systems (18m)
  Core components and principles of heating, ventilation, and air conditioning for facilities.
- Fundamentals of Electrical Systems in Buildings (20m)
  Key electrical concepts, safety standards, and how they support building functions.
- Introduction to Building Automation Systems (BAS) (15m)
  How automation controls and monitors HVAC, lighting, and other systems.
- The Role of Facility Managers in System Integration (10m)
  Responsibilities and skills needed to manage multiple systems effectively.
- Tools and Technologies for Modern Facilities (22m)
  Software and hardware used in daily management, including BMS and IoT devices.
- Setting Up Your Learning Environment (8m)
  Prepare for practical exercises with simulation tools and resources.
- Common Challenges in Facility Systems (14m)
  Identify typical problems like inefficiency and maintenance issues, and how to approach them.

Core Concepts

- HVAC System Design Principles (25m)
  Learn how HVAC systems are designed for comfort and energy efficiency in various building types.
- Electrical Load Calculation and Distribution (30m)
  Step-by-step guide to calculating electrical needs and designing distribution systems.
- Building Automation Protocols and Standards (20m)
  Understand protocols like BACnet and LonWorks that enable system communication.
- Energy Management Fundamentals (18m)
  Basics of monitoring and reducing energy use across facility systems.
- Control Systems for HVAC (22m)
  How thermostats, sensors, and controllers regulate HVAC performance.
- Electrical Safety and Compliance (16m)
  Key safety practices and regulations to ensure safe electrical operations.
- Integrating BAS with HVAC and Electrical (28m)
  Strategies for connecting automation systems with HVAC and electrical for unified control.
- Data Monitoring and Analysis Basics (15m)
  How to collect and use data from systems to spot trends and issues.
- Cost-Benefit Analysis for System Upgrades (20m)
  Evaluate the financial impact of upgrades to make informed decisions.

Deep Dive

- Advanced HVAC Troubleshooting (32m)
  Techniques for diagnosing and fixing common HVAC problems in complex setups.
- Electrical System Fault Diagnosis (28m)
  Methods to identify and resolve electrical faults to minimize downtime.
- Programming Building Automation Controllers (35m)
  Hands-on guide to setting up and programming BAS controllers for specific tasks.
- Network Infrastructure for BAS (25m)
  Design and manage networks that support automation systems securely.
- Advanced Energy Optimization Techniques (30m)
  Use data and controls to fine-tune systems for maximum energy savings.
- Case Study: Retrofitting an Old Building (40m)
  Real example of updating HVAC, electrical, and automation in an existing facility.
- Simulation and Modeling for System Design (30m)
  Use software to model system performance before implementation.

Advanced Application

- Designing Integrated Facility Systems (45m)
  Create plans that combine HVAC, electrical, and automation from the start.
- Project Management for System Implementation (35m)
  Manage timelines, resources, and teams for successful installations.
- Vendor Selection and Management (25m)
  How to choose and work with suppliers for equipment and services.
- Commissioning and Testing Procedures (30m)
  Ensure systems work as intended through structured testing phases.
- User Training and Documentation (20m)
  Train staff and create guides for ongoing system use and maintenance.
- Maintenance Strategies for Longevity (28m)
  Develop preventive maintenance plans to extend system life and reliability.
- Real-Time Monitoring and Alerts (22m)
  Set up dashboards and notifications to track system health continuously.
- Handling System Failures and Emergencies (35m)
  Procedures for responding to breakdowns and ensuring quick recovery.
- Legal and Regulatory Considerations (20m)
  Navigate codes and standards that affect facility system management.
- Budgeting for Facility Upgrades (25m)
  Plan and manage finances for system improvements and maintenance.

Implementation & Next Steps

- Creating an Implementation Roadmap (30m)
  Outline a step-by-step plan for integrating systems in your facility.

- Stakeholder Communication and Buy-in (20m)
  Engage management and teams to support system integration projects.
- Phase-wise Implementation Example (35m)
  Walk through a sample project that rolls out changes in stages.
- Monitoring Implementation Progress (18m)
  Track milestones and adjust plans based on performance data.
- Adjusting Systems Based on Feedback (22m)
  Use user input and data to refine system settings and operations.
- Future Trends in Facility Systems (25m)
  Explore emerging technologies like AI and advanced sensors shaping the field.
- IoT and Smart Building Technologies (30m)
  How connected devices are changing facility management practices.
- Sustainability and Green Building Practices (28m)
  Integrate eco-friendly approaches into system design and operation.
- Career Paths in Facility Management (15m)
  See roles and opportunities for professionals with these skills.
- Building a Professional Network (10m)
  Connect with peers and experts to share knowledge and support.
- Continuing Education and Certifications (12m)
  Find resources and credentials to advance your expertise.
- Course Wrap-up and Next Steps (18m)
  Review key takeaways and plan how to apply what you've learned.

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