

## LANEY COLLEGE, Environmental Control Technology Program

# Educating Technicians for Building Automation and Sustainability

## Building Technicians are Key to Sustainable Energy Solutions



Commercial buildings are responsible for 38% of electricity consumption in California...

... making them an important target for greenhouse gas reduction and energy efficiency goals. A significant percentage of wasted energy in commercial buildings is due to building controls malfunctioning or not being utilized to optimize energy savings.

Inconspicuously located in a corner of a room or hallway and controlled via computer screen at a remote location, these small devices regulate the supply of hot or cold air, humidity and lighting levels, and can be programmed to turn systems up, down, on, or off in correlation to occupancy schedules, utility rate structures, weather conditions, and to immediately respond to security and safety needs. Control systems are a prime source for energy savings and key to occupancy comfort.

Operating building automation systems takes skilled technicians well versed in computer programming, mechanical and electrical building systems, whole building performance, and energy analysis. Building technicians with these combined skill sets are in high demand.



#### Developing Curricular Pathways in Building Automation and Sustainability

Laney is developing an in-depth curricular pathway for students to gain expertise in maintaining, programming, and troubleshooting building automation systems for energy efficiency and sustainability.



## Building Technicians are Key to Sustainable Energy Solutions



Typical skill sets of building automation technicians include:



Reading, interpreting, and programming control system software

• System networks integration from different manufacturers, using common "open source" software, and manufacturer independent protocols

 Mechanical and electrical skills for troubleshooting commercial HVAC and control systems

• Optimizing relationships between building performance, occupant comfort, and indoor air quality

 Integrating HVAC, lighting, security, and fire/life/ safety controls



 Advanced energy management techniques, in cluding trend analysis, utility, and rate structure analysis, and load shedding

 Building commissioning and retro-commissioning strategies for energy efficiency



## HVAC Commercial Systems and Building Automation Lab



Today's building automation technicians need to be prepared for multiple challenges in control system complexity.

Laney College installed a full-size hydronic commercial HVAC lab as part of a recent NSF ATE grant. With the support of the current grant, Laney is installing a full-size multi-vendor building control system for its commercial HVAC lab. The latest devices on the market will operate in unison to support HVAC training equipment in the lab. The different systems will be fully integrated through an interoperable network, simulating on-the-job challenges, typical program faults and troubleshooting scenarios, as well as the latest trends in building automation.

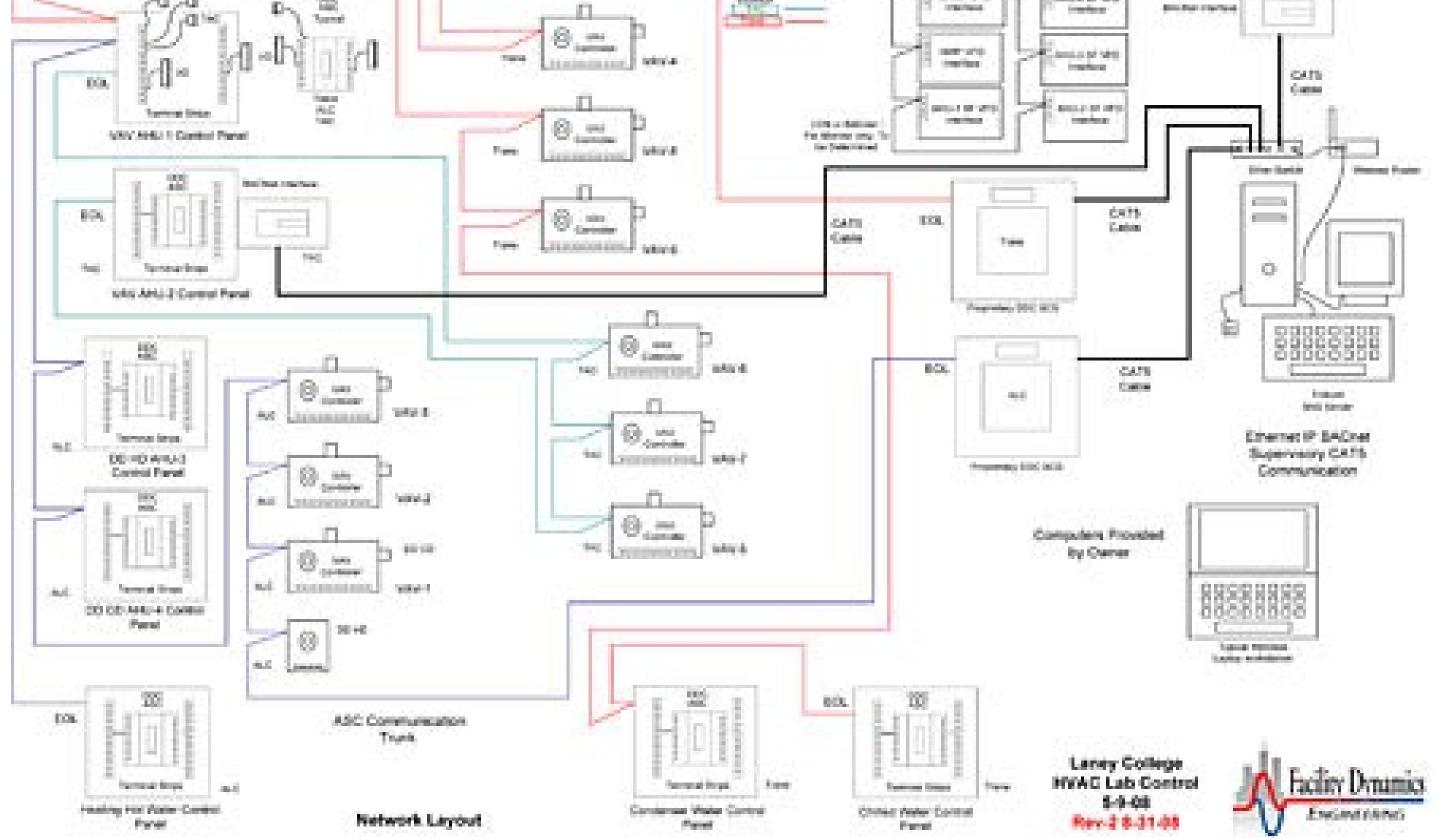
Air handling unit with economizer, sensors, valves, and circuit setters



Industry donations of hydronic lab system components exceed \$100,000.







## Educating Technicians for Building Automation and Sustainability

A Project Supported by the National Science Foundation





#### Co-PI: UC Davis, Western Cooling Efficiency Center

#### Project Components

#### Curriculum Development

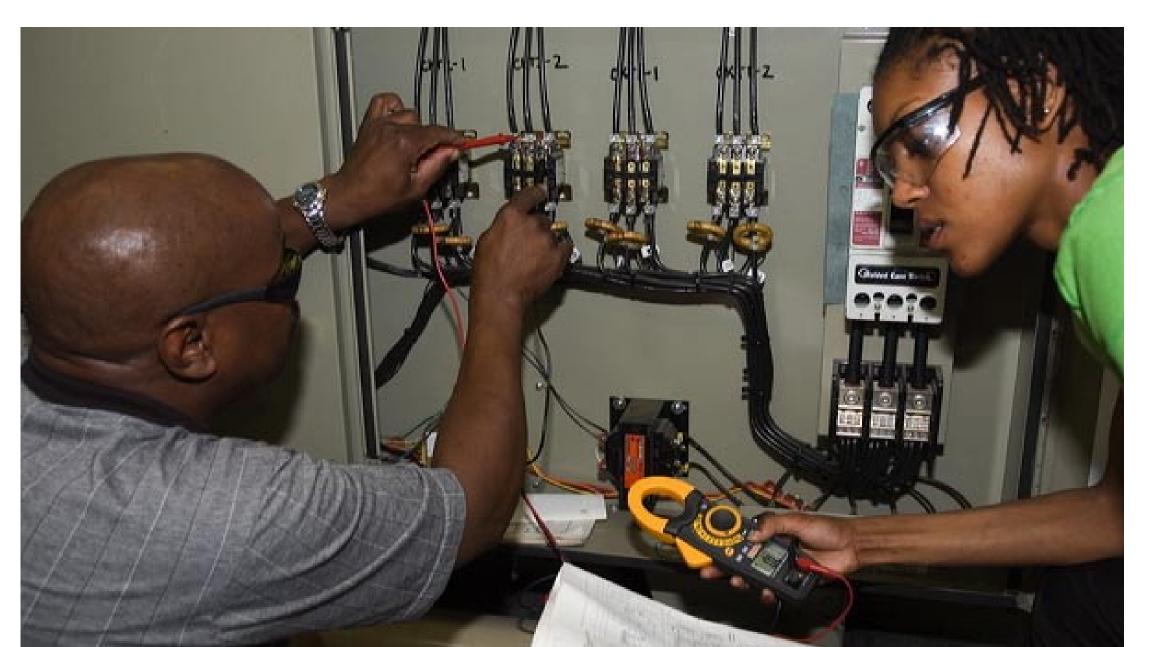
\* New advanced coursework, certificate and AS degree in



- building automation systems and energy management
- \* Career awareness course in sustainable energy practices
- \* Specialized courses in high-tech facilities
- \* Expansion of physics for building science high school program and teacher training.

#### Lab Development

- \* Integration of multi-vendor control systems in commercial HVAC lab
- \* Development of multi-vendor building automation test-bench lab
- \* Development of replicable training units to teach best energy management in HVAC and controls
- \* Development of field site case studies



#### Research

- \* Conduct original research to map the gaps between building technicians' capabilities and building automation system management requirements
- \* Create extensive documentation of best energy management practices for HVAC technicians

#### Partners

\* Project partners include industry, schools, community colleges, university partners, utilities, government, community-based organizations, and research agencies. See our Partners list.





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#### **Project Partners**

ACCO Engineered Systems ATEEC Automated Logic Corp. **Bayside HVAC Products Belimo Air Controls** Bell Systems Building Intelligence Group California Community Colleges Economic Workforce Development Division California Energy Commission California Polytechnic University **Carrier Corporation** Center for the Built Environment, UC Berkeley City of Oakland Controlco CSU East Bay Danfoss Co. EB Ward Ella Baker Center for Human Rights Facility Dynamics Engineering, Inc.

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