

UC Berkeley Extension Certificate in HVAC

COURSE DESCRIPTIONS

HVAC System Load Calculations and Psychrometry – Required

X469 (2 semester units in Mechanical Engineering)

Understand the thermodynamics principles of air-vapor mixtures; learn practical applications and use of psychrometric tables and charts; examine psychrometric processes of cooling, heating, humidification, dehumidification, air-stream mixture and learn effective measurements tools and methods. Learn how to calculate HVAC system load and apply the principles of psychrometric processes to the design of optimal air-conditioning and heating systems and energy management. You also study best practices in system design strategies for LEED from real-world case studies.

HVAC Ductwork and Piping Systems – Required

X470 (2 semester units in Mechanical Engineering)

This course presents the engineering fundamentals and practical considerations for the design of components and layout of HVAC systems and equipment. It is a practical course that outlines the design process for all major HVAC components commonly in use. Energy conservation measures are highlighted throughout the course and presented with consideration for energy codes, utility rebate programs, and economic evaluation. The emphasis is on commercial applications in the greater Bay Area.

HVAC System Design Considerations – Required

X472 (2 semester units in Mechanical Engineering)

This course considers the practical questions confronting senior project engineers and principals during the design of an HVAC system. The design process, system selection, and equipment selection will be discussed. Business decisions, including determining a competitive fee, and their relation to design will be discussed. Additional subjects addressed will be energy conservation and Title 24, commissioning, green building design, and electrical considerations relating to HVAC design.

HVAC Control and Energy Management Systems – Required

X473 (2 semester units in Mechanical Engineering)

This course provides the practicing engineer, designer, and building operation engineer with a working knowledge of the principles involved in the selection and design of temperature controls for HVAC systems. Topics include controls theory and fundamentals; pneumatic, electric, electronic, and computer-based hardware; control application for zones; air handlers; and chilled-water and hot-water systems. On completing the course, you should be able to specify and design control systems for normal applications. *Enrollment is limited.*

IAQ, HVAC, and Green Building – Elective

X410 (2 semester units in Mechanical Engineering)

Designed for individuals interested in indoor air quality who design and operate buildings, this course covers common indoor air pollutants and their sources, how to investigate, test, and resolve indoor air quality complaints, and the role of ventilation systems. You examine indoor air quality in the LEED process and learn how and why to select materials and furnishings with low or no emissions that also do not negatively impact the indoor environment. You study why and how to incorporate low emission materials in building design, find out how indoor air quality testing programs support LEED certifications, and examine options to maximize the LEED certification process from the indoor air perspective. You learn step-by-step investigation techniques, air sampling and analysis procedures, and how to interpret the

UC Berkeley Extension Certificate in HVAC

results of investigative efforts. You also investigate numerous indoor air pollutants, including volatile chemicals, mold, asbestos, lead paint, and Legionella bacteria.

Hands-On Building Commissioning for LEED – *Elective*

X493 (2 semester units in Civ. & Env. Engineering)

The demand for sustainable building construction and maintenance practices continues to grow. This is evidenced by the growing numbers of LEED certified facilities. One of the key prerequisites for LEED certification requires that the building undergo commissioning. You learn in details the commissioning process and develop and complete the key documents and deliverables. The hands-on approach features testing on actual building systems.

Implementing LEED 2009 Strategies – *Elective*

X496 (2 semester units in Civ. & Env. Engineering)

Prepare for a career in a field related to LEED building certification. Master hands-on skills in managing LEED project administration process and gain proficiency with practical tools such as LEED online, project checklists and submittal templates. Gain insight to challenges and best practices. Examine technical contents of LEED programs in New Construction, Existing Buildings, Commercial Interiors, Core and Shell and Schools. Learn from real-world case studies and take a mock building to LEED platinum.

The Building Envelope – *Elective*

X413.3 (2 semester units in Architecture)

Examine sustainable design strategies for the building envelope focusing on the control of heat, light, sound, moisture, and air movement. After a basic overview of solar geometry, climate, and thermodynamics, you study heat movement through a building envelope, along with the calculations and software tools used by designers to predict energy use. Solar control is a critical issue and you focus on passive heating strategies, shading device design, and glass selection. You also learn simple strategies to use daylight to illuminate interior spaces.

Facilities Management: Systems and Technology – *Elective*

X412.3 (2 semester units in Business and Management)

Focus on the role of a facilities management systems manager by understanding the impacts of technology and reviewing successful case studies. You review systems such as telecom and cable management, basic information technology (IT); uninterrupted power supply (UPS); computer-aided facilities management (CAFM); computer-assisted drawing or drafting (CAD); computerized maintenance management system (CMMS); energy management systems (EMS); heating, ventilation, and air conditioning (HVAC); geographic information systems (GIS); computer-integrated facilities management (CIFM); project management; asset management; and cost management.