

Number & Title of Course: ARCH 307 Environmental Control Systems 2 (lecture component).

Course Description: Continuation of ARCH 207 plus theory and application of climate, energy use and thermal comfort as determinants of architectural form for internally load dominated buildings. Emphasis on architectural and mechanical methods of ventilating, cooling, heating, lighting, acoustics, and water and waste systems. 2 lectures, 2 discussions.

Program Goals & Course Outcomes

- Understand the technical aspects of architectural design, building systems, and construction materials, considering the environmental impact of such decisions.
 - Ability to demonstrate the principles of environmental systems design, how design criteria can vary by geographic region, and the tools used for performance assessment (B6).
 - Understanding the selection and application of building envelope systems (B7).
 - Understanding the selection and application of building service systems (B9).
- Make reasonable decisions based on an architectural understanding of ethics, diversity, and sustainability.
 - Understand sustainable principles through the study of energy flows, materials, assemblies, forms, climate and site (SLO 1).
 - Explain how natural, economic, and social systems interact to foster or prevent sustainability (SLO 2)

Student Performance Criteria Addressed

B6 Environmental Systems

B7 Building Envelope Systems and Assemblies

B9 Building Service Systems

Topical Outline

Lighting (25%)

HVAC and thermal comfort (31%)

Acoustics (19%)

Water and waste (19%)

Indoor air quality (6%)

Prerequisites: ARCH 207. Concurrent with ARCH 352

Required Textbooks/Learning Resources

Lechner, Norbert, *Heating, Cooling, Lighting*. New York: Wiley, 2015.

Recommended Textbooks/Learning Resources

Alread, Jason, *Design Tech: Building Science for Architects*. New York: Routledge, 2014.

Brown, Z.G., and Mark DeKay. *Sun, Wind & Light*. New York: Wiley, 2014.

Grondzik, Walter, et. al. *Mechanical and Electrical Equipment for Buildings*. New York: Wiley, 2014.

Hawkes, Dean, *The Environmental Imagination*. New York: Routledge, 2007.

Kwok, Alison, and Walter Grondzik. *The Green Studio Handbook*. Burlington MA: Architectural Press, 2011.

Sefaira. Performance-modeling software.

Offered: Winter annually.

Faculty Assigned: Meredith Sattler (Assistant Professor), Sandy Stannard (Professor), and Carmen Trudell (Assistant Professor).