

## MASTER SYLLABUS

**COURSE NO., HOURS, AND TITLE:** ID 481 - 3  
Environmental Design III – Energy & Systems

### **COURSE DESCRIPTION:**

The study of the influences of energy, human comfort, climate, context, heating, cooling, and water on the design of buildings and sites. The design of passive and active environmental systems with continued emphasis on daylighting, acoustics, and design strategies for sustainability. Not for graduate credit. Prerequisite: 272, 392, MATH 111, PHYS 203a and b, and major in interior design or consent of the department chair.

**PREREQUISITE TO:** ID 492 - Interior Design Studio IV

### **COURSE OBJECTIVES:**

Upon completion of this course, the student will:

1. Develop an understanding of global climate and resources in relationship to the design of individual buildings and sites and an introduction of the principles of sustainable design with emphases on indigenous architecture.
2. Develop an understanding of the basic principles of ecology and responsibilities with respect to environmental and resource conservation in architecture and urban design.
3. Develop an understanding of climate, human comfort, and design strategies for cooling and heating.
4. Further develop an understanding of sites and resources with emphases on solar access, wind and air, rain and groundwater, and vegetation.
5. Develop an understanding of the principles of heat flow and basic principles that inform the design of building envelope systems.
6. Develop design strategies for heating and cooling with respect to zoning, daylighting, passive solar heating, passive cooling, heat loss, heat gain, and applied psychrometry.
7. Develop an understanding of HVAC systems for small and large buildings with emphases on healthy environments.
8. Develop an understanding of the use of computer programs to represent and analyze building performance.
9. Develop an understanding of water and water basics, storm water, water supply, water and waste, and solid waste.
10. Develop an understanding of basic plumbing principles and the ability to layout systems.

11. Develop an understanding of the fire protection and suppression systems.

**TOPICAL OUTLINE:**

<b>Topics</b>	<b>Percentages of Time</b>
I. Context For Building Systems Design	7%
A. World resources	
B. Sustainable design principles	
II. Climate, Comfort, and Design Strategies	7%
A. Comfort	
B. Climate	
C. Design strategies	
III. Site and Resources	6%
A. Solar access	
B. Wind and air	
C. Rain and groundwater	
D. Vegetation	
IV. Heat Flow	10%
A. Building envelope	
B. Heat flow analysis	
C. Seasons, solids, air, windows, skylights	
D. Moisture and infiltration	
V. Designing for Heating and Cooling	20%
A. Zoning and daylighting	
B. Passive solar heating	
C. Passive cooling	
D. Heating and cooling load calculations	
E. Applied psychrometry	
VI. HVAC Systems for Buildings	20%
A. Typical design process	
B. Control systems	
C. Heating-Cooling systems	
D. Psychrometrics and refrigeration	
VII. Water and Waste Systems	20%

- A. Water, storm water and water basics
- B. Water supply
- C. Water and waste
- D. Solid waste

VIII. Fire Protection

10%

- A. Alarm systems
- B. Suppression systems

**TEXTBOOKS:**

**Required:**

Stein B., & Reynolds J. (2000). *Mechanical and electrical equipment for buildings*. New York: Wiley.

**Recommended:**

Brown, G. (1992). *Insideout: Design procedures for passive environmental technologies* (2nd ed.). New York: Wiley.

Fathy, H. (1986). *Natural energy and vernacular architecture: Principles and examples with reference to hot arid climates*. Chicago: University of Chicago Press.

McHarg, I. (1992). *Design with nature*. New York: Wiley.

Yeang, K. (1995). *Designing with nature: The ecological basis for architectural design*. New York: McGraw-Hill.