

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
SCHOOL OF ENGINEERING
DEPARTAMENT OF CONSTRUCTION ENGINEERING AND MANAGEMENT
ABET COURSE SYLLABI

ICC2354 SUSTAINABLE BUILDINGS DESIGN

Credits and contact hours: 10 credits / 10 hours / (3 hours in lectures, 3 h. applied project, 4 h. individual work)

Instructor's name: Sergio Vera

Course coordinator's name Sergio Vera

Textbook: Mumovic, D.; Santamouris, M. (ed.) (2009): A Handbook of Sustainable Building Design and Engineering: An Integrated Approach to Energy, Health and Operational Performance. Earthscan Publications.

Course Catalog Description: This course introduces students to sustainable buildings from the design perspective. The purpose of the course is the students understand the challenges involved in the design of sustainable buildings, and the aspects and phenomena that influence the buildings' indoor environmental quality (IEQ) and energy efficiency; know and assess the performance requirements of sustainable buildings and, then, choose the materials and construction systems that allow complying with those requirements; know and understand different design strategies; and use of simulation tools for the design of sustainable buildings.

Prerequisite Courses: ICC2104 Technology of Civil Engineering Materials and ICC2304 Construction Engineering

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:

1. Understand the challenges and complexity in the design of sustainable buildings.
2. Understand the key role of integrated design on the process of sustainable building design.
3. Identify and quantify the buildings' IEQ and energy efficiency requirements.
4. Recognize the factors that influence the buildings' IEQ, especially those regarding thermal isolation, protection against moisture, acoustic isolation and noise control, and lighting.
5. Recognize the factors affecting the buildings' thermal and energy performance.
6. Select materials and design construction systems that allow fulfilling the new projects' sustainability requirements.
7. Understand the assessment and certification methodologies of

sustainable buildings (i.e LEED).

8. Know and apply the current national standards on the thermal, moisture and acoustic areas.

**Relation of Course to ABET
Criteria:**

- b. Designing and conducting experiments: to analyze and interpret data.
- c. Designing a system, component, or process.
- e. Identify, formulate, and solve engineering problems.

Topics covered:

1. Sustainable building design
2. Fundamentals of heat transfer
3. Efficient energy
4. Buildings' indoor environmental quality
 - 4.1. Thermal comfort
 - 4.2. Protection against humidity
 - 4.3. Lighting
 - 4.4. Noise control and acoustics
 - 4.5. Air quality
5. Integrated design of sustainable buildings
6. International certification systems (i.e. LEED)
7. Introduction to Fire Safety Engineering