Real Estate Development Program (MsRED)
Graduate School of Architecture, Planning and Preservation
Columbia University
September 2014

The Economic and Environmental Case for High Performance Building

3.0 Credits - Fall

The Economic and Environmental Case for High Performance Building is designed to provide the next generation of real estate industry professionals with the financial arguments and technical know-how of building systems to become effective change agents in developing high performance and healthy buildings. The curriculum engages students with a mock project in which students become developers, selecting systems to achieve a high performance building, while grappling to justify first cost premiums. Students will also have several green building tours, undertake informal market analysis, complete a life cycle cost model, and learn to seek out and apply precedents and lessons learned from other green building projects.

This course is strongly recommended for everyone in the program as a technical introduction to building systems, from envelope construction to mechanical systems options.

Leaders

Steven Baumgartner, PE, CEM, HBDP, LEED AP, Associate Principal, Buro Happold
Charlotte Matthews, Vice President of Sustainability, Related Companies

Time and Location

Tuesdays, 3:30 pm to 5:30 pm
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First Class: Tues, September 2, 2014
Exceptions: There will not be class during ULI week (10/21) or on Election Day (11/4).

Teaching Assistant

David Mosey. dem2172@columbia.edu

Text Book

Title: Heating, Cooling, Lighting Sustainable Design Methods for Architects, Third Edition
Author: Norbert Lechner
Publisher: Wiley

Mock Project Description

Students will develop a high-performance building on the site of 675 3rd Avenue.

Deliverables and Grading

Grading will be based on class participation, homework, in-class presentations and testing. Class lecture and discussion is the primary vehicle of education for this course so attendance and participation is mandatory. Homework consists of reading, group work on the mock project and presentation, and life cycle cost exercises.
All assignments are due at the beginning of class

Class Schedule at Topic Areas

Date	Week	Title Topic	Topic(s)
2-Sep-14	1	Setting the scene	Are buildings achieving their purpose? What is high performance building? Split students into teams.
9-Sep-14	2	Designing for the site	Passive solar design, site environmental analysis, massing within zoning constraints
16-Sep-14	3	Envelope design	Thermodynamics (how heat moves), envelope design, thermal bridging, R-value & U-values
19-Sep-14		TOURS	One Bryant Park and 675 3rd Ave. Time: 1.45 – 3.45 Meeting Place: One Bryant Park Lobby (6th Ave. at 42nd Street)
23-Sep-14	4	Windows, daylighting & lighting	Window construction, designing for daylighting, lighting basics, technology and controls
30-Sept-14	5	Efficient heating	Overview of heating systems, calculating loads, heat capacity of water vs. air, gas vs. electricity as fuel
7-Oct-14	6	Efficient air conditioning	Overview of air conditioning systems, internal heat gains refrigerant cycle, central vs. distributed systems; split incentive
14-Oct-14	7	Indoor air quality and material toxicity	Ventilation: supply and exhaust, health product declaration, green housekeeping
21-Oct-14		ULI WEEK	No Class
28-Oct-14	8	Site, Stormwater & Water	Heat island effect, stormwater management, retention and reuse, water conservation
4-Nov-14		ELECTION DAY	No Class
11-Nov-14	9	Energy generation, management, and procurement	Cogen, solar hot water heating, solar power, wind, REC's, portfolio energy management and procurement
18-Nov-14	10	Commissioning, construction and operations	Retro/commissioning, green construction methods, green tenant services, M&V, green leasing
25-Nov-14	11	LEED	Overview of LEED and run through of checklist
2-Dec-14	12	Final exam and review	