

**Three Day Workshop**  
 on  
**Energy Simulation of Buildings for LEED and ECBC**  
**(Feb. 29-March 2, 2008)**  
 organized by  
**Center for IT In Building Science**  
 at  
**International Institute of Information Technology**  
**Gachibowli, Hyderabad - 500 032**  
**(Under Continuing Education Programme)**

**ABOUT THE WORKSHOP:**

Introduction of LEED-India and launch of Energy Conservation Building Code (ECBC) are the two major milestones in constructing green and energy efficient India through the building sector. Since LEED-India has a major focus on energy efficiency in buildings, one of the major challenges in front of designers trying to obtain LEED rating is to ensure the level of energy efficiency. The ECBC is voluntary at this stage but is likely to be mandatory for commercial buildings in near future. Both of these systems demand the upcoming buildings to be more efficient as compared to standard buildings of same shape and usage. Comparison of proposed designs with base case / standard case can be carried out by use of energy simulation tools. Building energy simulation tools provide facility to embed energy efficiency in buildings by predicting their behavior under given climatic conditions and usage patterns. These tools, help to predict energy consumption in buildings and provide opportunity to compare different design options through techno-economic analysis. Decisions related to use of insulation on roof, advanced glazing, high performance HVAC system can be taken with much elevated confidence level. This three day workshop is, therefore, a unique opportunity of its kind to learn how to perform energy simulation of buildings for LEED and ECBC through hands-on training on simulation tools and case studies. Besides sailing through the process of building energy simulation up to report preparation stage, the workshop would also cover fundamental concepts required to utilize these simulation tools in best possible way. This course addresses the skills and knowledge requirements for carrying out energy simulations for LEED and ECBC. Some common question such as – how much detailing is required for energy modeling; what are the impacts of lighting, internal loads, occupancy schedules; how to analyze simulation results and propose energy conservation measure (ECMs), how to rank ECMs on life cycle cost basis; would be answered through interactive exercises.

**COURSE OUTLINE :**

The three day intensive programme explores the following topics through simulations and concept building lectures:

**Day 1: (0900-1700hrs)**

<b>Forenoon: Overview of building from energy perspective</b> <ul style="list-style-type: none"> <li>• What is a building from energy perspective?</li> <li>• Heat transfer in building, internal gains, U and R-value, thermal storage, SHGC, Lighting Power Density</li> <li>• Parameters affecting building performance</li> <li>• Composition of annual energy consumption – internal load, lighting, conductive gain, radiative cooling</li> <li>• Target values for cooling, lighting, overall performance</li> <li>• Tools of the trade</li> </ul>	<b>Afternoon: Planning for building energy simulation, Creating a simple building</b> <ul style="list-style-type: none"> <li>• Zoning</li> <li>• Material properties</li> <li>• Building usage, defining schedules and loads</li> <li>• Location, climate data (understanding the data, degree day, design day)</li> <li>• Creating two zone building geometry</li> <li>• Simulation and results</li> <li>• Parametric analysis</li> </ul>
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At the end of Day-1, participants would know what are important Inputs, how to simulate, read output, see and understand the effect of change in main parameters

**Day 2: (0900-1700hrs)**

<b>Forenoon: Solar Exposure of buildings, daylighting and artificial lighting</b> <ul style="list-style-type: none"> <li>• Introduction to Sunpath diagrams</li> <li>• Using Sunpath for massing, shading &amp; shadowing analysis and overhang design</li> <li>• Introduction to daylight</li> <li>• Daylight simulation using radiance</li> <li>• Simulation and results</li> <li>• Parametric analysis</li> </ul>	<b>Afternoon: LEED/ECBC requirements</b> <ul style="list-style-type: none"> <li>• Salient features and mandatory requirements for LEED/ECBC</li> <li>• Creating standard building as per ASHRAE 90.1/ECBC, real life project</li> <li>• Discussion/checks on common mistakes, cross-checking, tricks for simplification of model</li> </ul>
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At the end of Day-2, participants would know how to read and use sunpath diagrams, perform daylight simulations and to create base case for simulation as per LEED/ECBC

**Day 3: (0900-1700hrs)**

<b>Forenoon: Analysis using simulation</b> <ul style="list-style-type: none"> <li>• Creating 'As is' case model</li> <li>• Generation of ECMs.</li> <li>• Passive ECMs</li> <li>• Comparison of Base case, 'As is' case and ECMs</li> </ul>	<b>Afternoon: Compliance checking and report preparation</b> <ul style="list-style-type: none"> <li>• LEED/ECBC templates</li> <li>• Preparation of report</li> </ul>
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At the end of Day-3, participants would have experienced entire process of energy simulation including final report writing for LEED/ECBC.

## About IIIT Hyderabad:

IIIT Hyderabad is an autonomous, self-supporting institution started in 1998. A major goal of IIIT is to impart a uniquely broad and interdisciplinary IT education of the highest academic quality. This is achieved through an integrated curriculum that consists of a highly diverse set of IT courses, inter disciplinary IT research projects, day-to-day interaction with industry, preparation in entrepreneurship and personality development courses. The institute offers Undergraduate, Postgraduate and Doctoral level programmes in IT, Electronics and Communications, and applications of IT in various domains. The institute is carrying out advanced Research and Development in Information and Software Technologies and their societal, scientific, industrial and financial applications. This is achieved by having research centres such as: Language Technologies Research Centre (LTRC), Centre for VLSI and Embedded Systems Technology, Centre for Data Engineering, Centre for Visual Information Technology, Robotics Research Centre, Centre for IT in Building Science, Earthquake Engineering Research Centre, communications Research Centre, Bioinformatics Research Centre, Power Systems Research Centre.

## ABOUT CBS

The centre aims at developing and spreading the use of IT for the betterment of buildings in terms of projects, processes and performances. CBS emphasizes on studying, applying and improving various IT tools for visualization, optimization, thermal, illumination and acoustic modeling.

## COURSE FACULTY:

### **Vishal Garg**

Dr. Vishal Garg is a civil engineer from University of Jodhpur and Ph.D. from "Centre for Energy Studies" in IIT Delhi. He also worked as JRF in Germany on development of a Building Geometry Submodel for the IKARUS (Instrument for Greenhouse Reduction Strategies) Space Heat Model. Subsequently, he joined IIIT Hyderabad as assistant professor. He has worked on fiber optic based lighting, fuzzy logic based task control of lighting and heating, venetian blind control. His current research includes development of a protocol and frame work for wireless control of devices in buildings and developing a user friendly CAD interface for EnergyPlus. Along with research, he is involved in teaching Building Automation & Controls, Intelligent Buildings, Energy Simulation using EnergyPlus, Lighting Design & Technology to post graduate students in the area of building science.

### **Jyotirmay Mathur**

Dr.-Ing. Jyotirmay Mathur is a mechanical engineer from University of Jodhpur, postgraduate in energy studies from IIT Delhi and doctorate from Germany. He specializes in the areas of energy efficiency and design related issues in solar passive architectural concepts. He has worked on several national / international projects related to energy and environmental analysis, life cycle assessment, development of solar chimney and wind tower for ventilation in buildings. He has published 18 research papers in various journals of international repute and presented 40 papers in national / international conferences and edited five books. He is teaching various courses related to renewable energy sources, energy conservation, energy and environment as Reader in the mechanical engineering department at MNIT Jaipur and Coordinator of postgraduate program in energy engineering.

### **S. Srinivas**

S. Srinivas is a Green Building Professional, at the CII-Sohrabji Godrej Green Business Centre, Hyderabad, India. He is a Principal Counselor and heads the Green Building division of the Centre. He is a LEED Accredited Professional. He is also a trained LEED Faculty and Assessor. He has been involved in helping Architects, Builders and Corporate in designing green buildings. Thus far, he has helped more than 110 clients in incorporating green designs in building construction. He has also trained professionals in green building concepts and has thus far conducted more than 150 training programmes on green buildings all over the country and in UAE (Dubai and Abu Dhabi). He has worked on several International projects with bilateral agencies. He is a key member working on the green building rating system for India, called 'LEED India'. Thus far the 'LEED India NC' and 'LEED India CS' programmes have been launched. He leads a team of Architects and Engineers who have more than 10 years of experience.

### **Gurneet Singh**

Gurneet Singh qualified as an architect at Chandigarh College of Architecture, Punjab University in 2002. After that he attained his Master of Technology in IT in Building Science from International Institute of Information Technology, Hyderabad. From July 2004 to date, he is working as an energy analyst in a firm called Environmental Design Solutions (EDS). He has been working on several prestigious projects with activities ranging from green building design, certification, energy simulation, day lighting and lighting simulation and analysis to total building commissioning. He has also developed his proficiency in various modeling and simulation tools such as Visual DOE, EnergyPlus, Radiance, AutoCAD, Revit, 3DMax.

## Tools used

DesignBuilder, eQUEST, DIALUX, Ecotect

## Pre-requisites

Good understanding of various services in buildings especially illumination and HVAC, familiarity with CAD and office applications. Participants should preferably bring their own laptops with the following tools installed: Design Builder (30 days evaluation version available at <http://www.designbuilder.co.uk/>), eQUEST (free tool available at: <http://www.dialux.com/>), DIALUX (free tool available at: <http://www.doe2.com/equest/>), and Ecotect (evaluation version available at: <http://www.squ1.com/>). It is also expected that an office suite, DXF and DWG viewer and PDF viewer are also installed.

### Contact:

#### **Dr. Vishal Garg**

Assistant Professor and Head

**CENTER FOR IT IN BUILDING SCIENCE,**  
International Institute of Information Technology,  
Gachibowli, Hyderabad-500 032.

Phone : 040-23001967 Ext. 125

Fax : 040-23001413

Mobile : +91-9949990900

E-Mail : [vishal@iiit.net](mailto:vishal@iiit.net)

Website : [cbs.iiit.net](http://cbs.iiit.net)

### Registration Information:

Fee :

Early registration (before 25<sup>th</sup> Feb ) : Rs. 15,000

Regular : Rs. 20,000

Cancellation: 90% fee will be refunded if cancelled 7 days before the start of workshop

Hostel Fee @ Rs. 300 per day (subject to availability)

**Demand Draft should be payable in favour of "IIIT – Hyderabad", payable at Hyderabad**

To ensure a highly interactive workshop, the number of participants is restricted to 30 and the registration will be on a first-come-first served basis. Pre registration can be done online at [cbs.iiit.net](http://cbs.iiit.net). The same will be considered as confirmed registration only after the fee is received.