

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE5014 - Sustainable Construction

Credit Distribution: C:9 L:3 T:0 P:0 E:0 O:6 TH:0

Course Type: Theory

Description: To learn the basics of sustainable construction and demonstrate the application through case studies and group projects.

Course Content: Building life cycle, resource use in the built environment, major environmental issues, three dimensions of sustainability, environment, economy and social aspects, construction ecology and principles of green engineering. Life cycle energy use in buildings, embodied energy, on-site construction energy, operational energy and demolition energy, methods to reduce life cycle energy use, introduction to net-zero energy buildings. Life Cycle Assessment (LCA), LCA Methods - Process LCA, EIO-LCA and Hybrid LCA, ISO standards for LCA and software tools available for LCA. Carbon footprint, parameters that influence emissions in building construction, methods to calculate emissions and carbon calculators. Green building ratings LEED, GRIHA, BREEAM, Green Globes, CASBEE, ICCES SAVE. Social aspects of Sustainability: Occupational health and safety of construction workers, Introduction to sustainable civil infrastructure development and case studies.

Text Books:

- Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery, Second Edition, John Wiley and Sons, Inc., 2008.

Reference Books:

- Adler, A., Armstrong, J., Azerbegi, R., Guy, G.B., Fuller, S.K., Kalin, M., Karolides, A., Lelek, M., Lippiatt, B., Macaluso, J., Spencer, E., Waier, P., Walker, A., Green Building: Project Planning and Cost Estimating, Second Edition, RS Means, Reed Construction Data, Inc., 2006.
- C.T. Hendrickson, L.B. Lave and H.S. Matthews, Environmental Life Cycle Assessment of Goods and Services: An Input-Output Approach, Resources for the Future Press, 2006.
- Liv Haselbach, The Engineering Guide to LEED-New Directions (Green Source): Sustainable construction, McGraw-Hill Professional, 2008.
- Martin Melaver and Phyllis Mueller, The Green building Bottom line: The real cost of sustainable building, McGraw-Hill Professional, 2008.
- Indian Green Building Council, Green building rating system: New construction and major renovations (LEED-India NC) reference guide version 1.0, Confederation of Indian Industry, CII-Sohrabaji Godrej Green Business Centre, Hyderabad, 2007.
- The Energy and Resources Institute Press, Green Rating for Integrated Habitat Assessment (GRIHA), Ministry of New and Renewable Energy and The Energy and Resources Institute, New Delhi, 2010.

Prerequisite: NIL