



AMITY  
UNIVERSITY  
— GURUGRAM —

In  
Association  
with



# LEED LAB CURRICULUM





## LEED LAB @ AMITY

Amity University being a leader in education has expanded his vision towards the sustainable and green building design and construction. Amity approach of education is to prepare students for 21st century careers by delivering competency-based education and innovative solutions by preparing the industry based syllabus and curriculum. Amity University Haryana Campus has three academic blocks which are certified as LEED PLATINUM for its green building design, operation and maintenance, the highest rating provided by LEED (Leadership in Energy and Environmental Design), USGBC (U.S. Green Building Council) in July 2017; very first educational Institute building in India and 2nd only in Asia. The LEED is the most widely used third party verification for green buildings incorporating highest levels of green parameters in use of materials, construction technology, use of natural light but are also operated and maintained with highest standards of energy efficiency. LEED is a framework to provide a life cycle of building from construction to operation by connecting our daily activities to the impacts they have on our planet. It also provides an opportunity to transform the built environment to green building.

Amity University has joined hand with GBCI to train and educate students to cater the upcoming industry need of green building by initiating an educational module; LEED Lab. 'LEED Lab' is a unique academic initiative which integrates a policy framework to classroom activity to get desired outcome in arena of sustainable built environment. Way forward the university has decided to start a 'LEED Lab' for this noble cause of ensuring sustainability. It is a key educational tool connecting students' passion for sustainability with their academic pursuits. It will help to equip next generation of sustainability advocates with the practical experience needed to differentiate them in today's job market. Through this programme students will be trained for Green building framework through class room activity along with project on existing building of AUH campus and their monitoring and assessment of existing building provide performance score of said building. At the end of the course students will be prepared for taking the exams of 'LEED Green Associate' and LEED Accredited Professional'.



# TEAM

## LEED LAB COACH:

- Prof. (Dr.) Padmakali Banerjee  
Pro Vice Chancellor  
Amity University Haryana

## LEED INSTRUCTORS:

- **Kushagra Rajendra, Ph.D (Team lead)**
- Ar. Nishant Nathani
- Ar. Geetika Verma
- Ar. Arun Bhandari
- Er. Hardik Saxena
- Dr. Praveen Kumar
- Ar. Meghna Vij
- Ar. Dilip Kushwaha
- Ar. Saloni Chadda

## ACADEMIC SUPPORT:

- Priyanka Kochhar  
Regional Manager  
Market Transformation, GBCI
- Prof. (Dr.) Bhavna Adhikari  
Dy. Dean, Academics  
Amity University Haryana
- Mr. Ravish Dhingra  
OSD  
Pro Vice Chancellor Office  
Amity University Haryana

## ELIGIBILITY:

UG/PG in Architecture, Planning, Civil Engineering, Environmental Sciences, Environmental Engineering and related disciplines





# COURSE MANUAL - LEED LAB

**Subject: LEED Lab    Credits: 3**

## **COURSE OVERVIEW**

Course Objective: LEED Lab is an attempt to train students for green building concepts and inculcate required skills for understanding of different aspect and parameters related to green building certification process. The teaching methodology is based upon, basic understanding of green building, followed by LEED requirements and processes of obtaining the LEED certification added with field/building based activities. Pedagogy is designed in a manner to utilize ICT tools to widen subjects understanding in an interactive manner. The curriculum is prepared in a way to give equal weightage to both theory and practical with adoption of continuous assessment through entire course period . Modules are planned to incorporate at least one live/case based demonstration as per requirement of LEED certification.

## **LEARNING OUTCOMES:**

This course is designed to produce the following outcomes:

1. The student will able to understand the technical aspects of green building, and national and international certification frameworks.
2. Student will able to assess and explore techniques to improve building exterior, site, water , energy consumption, remodeling, waste management, and procurement of materials for green building.
3. Recognize how improving building operation and maintenance lead to higher performance in green buildings.
4. Understand green building certification: pre-requisites, credits and the tools needed for implementation, and recognize synergies between multiple credits with special reference to LEED-EB: O+M
5. Students' ability to assess the performance of existing buildings and facilitate LEED for Existing Buildings: Operations and Maintenance (LEED EB: O+M) (through Arc performance pathway) process with the goal of certifying the facility such as registration, submission, and LEED online interface, will be strengthened.
6. At the end of the semester the students are prepared to appear for the LEED professional credential (i.e. LEED Green Associate and/or LEED Accredited Professional).



### COURSE PLAN:

The syllabus is well demarcated among ten different modules to cover basic concepts of green building with special emphasis on LEED certification for O & M (Existing Building). Each module is designed to cover fundamental information, followed by LEED requirements and practical activities such as site data collection and analysis, field visits, documentation and existing building based projects under heading of LEED live.

S.No.	Modules	Lectures Hours
1.	Module I Introduction to Green Building	3
2.	Module II Green Building Rating Systems	2
3.	Module III LEED Lab and Processes	5
4.	Module IV Site, Location and Transportation	3
5.	Module V Material and Resources	3
6.	Module VI Energy and Climate	5
7.	Module VII Water Efficiency/Environment	4
8.	Module VIII Indoor Environment & Human Comfort	3
9.	Module IX LEED Arc Platform	5
10	Module X Project Communication	3

### ASSESSMENT AND EVALUATION:

Based upon interactive pedagogy, students will be engaged in the continuous teaching-learning environment for an entire course period, including classroom lecture, discussions, guest lectures, field visit, outdoor activities, quiz and tutorials. Hence the evaluation is based upon their performance in every learning activity designed for the course curriculum.

Component Code	CA	PE	A	EE
Weightage Planned (%)	20	25	5	50



## SESSION PLAN: LEED Lab (Total No Sessions - 36)

Module	Content	LEED Live	Lecture Hours
<b>Introduction to Green Building</b>	<ul style="list-style-type: none"> <li>• Introduction to Course, Syllabus and assessment</li> <li>• Fundamental concepts of Green Building Design and Sustainability</li> </ul>	<ul style="list-style-type: none"> <li>• Home Assignment: Importance of Green Building and its benefits</li> <li>• Comparison of green and conventional building</li> </ul>	1-3
<b>Green Building Rating Systems</b>	<ul style="list-style-type: none"> <li>• Green Rating regime and their scope (regional and global)</li> <li>• Policies and legislations</li> </ul>	<ul style="list-style-type: none"> <li>• Case study: Different rating systems</li> <li>• Green building Operations Guide</li> <li>• Field visit: Any green certified building</li> </ul>	4-5
<b>LEED Lab &amp; Processes</b>	<ul style="list-style-type: none"> <li>• LEED Systems: Organization, fundamentals &amp; Role USGBC/GBCI</li> <li>• Structure of LEED rating (credit, prerequisites and requirements) and Impact categories</li> <li>• LEED Certification &amp; registration process</li> <li>• What, How and where to collect data for LEED certification</li> </ul>	<ul style="list-style-type: none"> <li>• Survey format and questionnaire</li> <li>• Physical case study: existing LEED certified building</li> <li>• File preparation for a LEED project (Registration document collection)</li> <li>• Quiz</li> </ul>	6-10
<b>Site, location and Transportation</b>	<ul style="list-style-type: none"> <li>• Scope and criterion of sustainable site.</li> <li>• Transport and resource footprint</li> </ul>	<ul style="list-style-type: none"> <li>• Transport survey (Origin-Destination, Parking, mode of transport)</li> <li>• Group discussion on site suitability (site: AUH Campus)</li> </ul>	11-13
<b>Material and Resources</b>	<ul style="list-style-type: none"> <li>• Fundamental concepts (LCA, Waste management, 3Rs and Health)</li> <li>• Procurement, declarations and documentations of Materials according to requirement of LEED certification</li> </ul>	<ul style="list-style-type: none"> <li>• Tutorial: bills, collection and calculations of Material in resources in building</li> </ul>	14-16



<b>Energy and Climate</b>	<ul style="list-style-type: none"> <li>• Basic concepts I (Building loads, Energy efficiency, Environmental concerns)</li> <li>• Basic concept II (Electrical systems, Visual &amp; thermal comfort and other concepts)</li> <li>• Energy commissioning &amp; performance management</li> <li>• Energy audit process, equipment and tools</li> </ul>	<ul style="list-style-type: none"> <li>• Team exercise 1: Data collection, reporting, preparation of site energy audit</li> <li>• Team exercise 2: Comparison between Design based report (DBR) and Performance based report (PBR)</li> <li>• Field visit: LEED certified building</li> </ul>	17-21
<b>Water Efficiency/ Environment</b>	<ul style="list-style-type: none"> <li>• Water use pattern, source and conservation scope (including water harvesting and treatment)</li> <li>• Water flow, fixtures and plumbing networks and water efficient appliances</li> <li>• Water Audit: Performance management and monitoring</li> <li>• LEED requirement and documentation plan</li> </ul>	<ul style="list-style-type: none"> <li>• Tutorial: water based calculations for LEED pre-requisites</li> <li>• Team exercise: Data collection, reporting, preparation for Water audit</li> <li>• Field exercise: Visit to STP for data collection (Site: AUH)</li> </ul>	22-24
<b>Indoor Environment &amp; Human Comfort</b>	<ul style="list-style-type: none"> <li>• Fundamentals of Indoor environmental quality (ventilation, air quality, indoor emission, green cleaning)</li> <li>• Health and occupational comfort (Natural lighting, Thermal, Quality view &amp; assessment-survey)</li> </ul>	<ul style="list-style-type: none"> <li>• Project based assessment of existing building</li> <li>• Class activity: Micro-climate improvement scope and use of instruments to monitor air quality</li> </ul>	25-27
<b>Arc Platform: Data collection for LEED certification</b>	<ul style="list-style-type: none"> <li>• Basic concepts and pre-requisites.</li> </ul>	<ul style="list-style-type: none"> <li>• Outdoor activity: live ARC interface</li> <li>• Team Activity: Working on live interface by uploading data</li> </ul>	28-32
<b>Project Communication</b>	<ul style="list-style-type: none"> <li>• Environmental/Building codes</li> <li>• Impact of built environment, sustainable &amp; regional design</li> <li>• Project Documentation follow up</li> </ul>	<ul style="list-style-type: none"> <li>• Class quiz: Building codes</li> <li>• Project Report: Comparison and compilation of all case studies</li> </ul>	33-36



# READINGS

1. Energy-efficient buildings in India, The Energy and Resources Institute (TERI), 2001
2. GRIHA MANUAL: Five volume set, The Energy and Resources Institute (TERI), 2011
3. Green Building: Guidebook for Sustainable Architecture, Springer, ed 2010
4. Green Building A to Z: Understanding the Language of Green Building, New Society Publishers, 2007
5. U.S. Green Building Council. Green Building and LEED Core Concepts Guide. 3rd Edition. U.S. Green Building Council, 2014.
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7. U.S. Green Building Council. LEED Operations and Maintenance Reference Guide. v4 Edition. U.S. Green Building Council, 2013.
8. Green Building Incentive strategies, US Green Building Council 2014
9. US Green Building Council LEEDv4 for operations and maintenance checklist. US Green Building Council, 2013
10. U.S. Green Building Council. LEED v4 Impact Category and Point Allocation Process, Overview. U.S. Green Building Council, 2013.
11. LEED Online: Register a project. US Green Building Council 2014
12. "Rating System Selection Guidance" U.S. Green Building Council 2014
13. U.S. Green Building Council. LEED v4 User Guide. U.S. Green Building Council, 2013.
14. U.S. Green Building Council. Guide to LEED Certification: Commercial. U.S. Green Building Council, 2014.
15. "Rating System Selection Guidance." U.S. Green Building Council, 2014.
16. "Addenda Database." U.S. Green Building Council.



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