Introduction

Construction activities in India have been pursued without giving much attention on environmental issues. This has resulted in pressure on its finite natural resources, besides creating impacts on human health and well-being. Unplanned and unsustainable urban development has led to severe environmental pressures. Modern buildings built in our cities have high levels of energy consumption because of requirements of air-conditioning and lighting. Such buildings consume copious quantities of water for building use and landscaping and generate substantial waste during construction and operation.

Green buildings and utility systems, on the other hand, can reduce energy demand by as much as 40% and water demand by more than 30%. They let in more natural light, recycle wastewater, integrate natural cooling systems with conventional air conditioning systems, use renewable sources of energy to reduce dependence on conventional sources and contribute towards sustainable development

About GRIHA

The Ministry of New and Renewable Energy (MNRE), Government of India and TERI have jointly developed GRIHA (Green Rating for Integrated Habitat Assessment), which has been endorsed as the national rating system for green buildings in India. With support from the Government of India and active participation of the private sector, over 10 million square metres of built up space is registered to be GRIHA compliant.

Implementation of GRIHA benchmarks ensures full compliance with various relevant national codes and standards (such as the Energy Conservation Building Code, the National Building Code, guidelines issued by the Central Pollution Control Board) and contributes to meeting objectives set forth in the National Mission on Sustainable Habitat and the Jawaharlal Nehru National Solar Mission.

The demonstrated impact of GRIHA projects includes quantification of resource use optimization, implementation of environmental commitments and enhanced transparency through a web based portal.

In addition to all Government of India and Public Sector Undertaking buildings that have to be minimum 3 Star GRIHA compliant, the Central Public Works Department (CPWD) has also notified that all their construction shall minimum 3 Star GRIHA rated.

About Vellore Institute of Technology

Vellore Institute of Technology (VIT), formerly Vellore Engineering College is a private deemed university institute located in the outskirts of Vellore, Tamil Nadu, India. Founded in 1984, as Vellore Engineering College, by G. Viswanathan, the institution offers 20 undergraduate, 34 postgraduate, four integrated and four research programs. GRIHA Council has received an expression of interest for conducting a 4 days training programme on GRIHA for the students pursuing B. Arch and M. Arch degree course at the Vellore Institute of Technology.

GRIHA Training Programme

The GRIHA Training Programme for VIT, Vellore will be divided into 2 parts

Day 1 to Day 3: GRIHA 3 Day Training Programme

The programme shall include comprehensive lectures under the variants GRIHA, SVAGRIHA and GRIHA for Exiting Buildings and cover the aspects of building design, construction and engineering that form part of GRIHA and sustainable habitats at large such as –

- Sustainable site planning
- Water and wastewater management
- Building design optimisation
- Energy performance optimisation
- Renewable energy utilisation
- Solid waste management
- Sustainable building material and construction technology
- Health, wellbeing and environmental quality etc.

Each session will be carried out with the presentation of the respective criteria followed by group exercises as well as individual exercises for the participants.

The aim of the training programme will be to empower the participants to get a comprehensive understanding of GRIHA rating system and how it acts as a tool that helps accomplish the aim of integrated design and planning, easily and effectively. At the end of the 3 Day Training Programme the students will be presented with Certificates. Also, the students will be eligible to take up the GRIHA Certified Professional examination after completing the training.

Day 4: Awareness Programme on SVAGRIHA and GRIHA for Existing Building

First Half: Awareness workshop on Simple Versatile Affordable GRIHA (SVAGRIHA)

Second Half: Awareness workshop on GRIHA for Existing Building (GRIHA EB)

Tentative Agenda for the training programme

DAY I			
1000 - 1030	**Introduction**	Overview of GRIHA	
1030 - 1045	Tea Break		
1045 – 1300	**Session-1: Site Planning & Construction Management**	Criterion 1-Site selection. Criterion 2-Low impact design. Criterion 3-Design to mitigate UHIE. Criterion 4-Site imperviousness factor. Criterion 5-Air and Water pollution control. Criterion 6-Preserve and protect landscape during construction. Criterion 7-Construction management practices.	The session shall start with a detailed presentation on sustainable site planning criteria of GRIHA with examples. During the practical session, the participants shall be divided into multiple groups by the facilitator. A design problem shall be given to the groups. The group shall be required to carry out a sustainable site planning exercise based on the problem. Scale models for varied site features (trees, lights, utility corridors) shall be used to carry out the exercise. The group representative shall be required to make a presentation on the proposed scheme by the respective group. The facilitator shall evaluate each scheme and give a critique on the same.
1300 - 1400	Lunch Break		
1400 - 1530	**Session-2: Occupant comfort and wellbeing- Daylighting only**	Criterion 11-Achieving indoor comfort requirements (visual/thermal/acoustic).	The second session on building design optimisation shall focus on two broad parameters; namely the basics of solar passive building design and the quantitative analysis of daylight based on criterion-11. The session shall cover the basics of daylight

			integration in buildings for optimizing energy consumption and achieving visual comfort. There will be a small exercise for applying daylight design knowledge gained in the session.
1530 - 1545	Tea Break		
1545 - 1800	**Session-2: Occupant comfort and wellbeing- Daylighting only(contd.)**	-	contd.
Day II			
1000 - 1100	**Session-3: Occupant Comfort & Well-Being - Artificial Lighting, Thermal & Acoustic Comfort.**	Criterion 11-Achieving indoor comfort requirements (visual/thermal/acoustic).	A detailed presentation will be made on optimizing artificial lighting design, achieving thermal comfort and Energy Conservation Building Code (ECBC) mandatory compliances per GRIHA requirements.
1100 – 1115	Tea Break		
1115 - 1300	**Session-3: Occupant Comfort & Well-Being - Artificial Lighting, Thermal & Acoustic Comfort (contd.)**	Criterion 08 –Energy efficiency	A detailed presentation will be made on achieving energy efficiency in the projects through various energy conservation measures. The session shall give a brief overview of energy optimising strategies such as efficient building envelope, equipment and HVAC design. There will be a small exercise on Energy Performance Index (EPI) calculation.
1300 - 1400	Lunch Break		
1400 – 1430	**Session-4: Socio-Economic Strategies**	Criterion 24-Labour safety and sanitation. Criterion 25-Design for Universal Accessibility.	A detailed presentation shall be made on providing better working and living conditions for the labours during construction work

		Criterion 26-Dedicated facilities for service staff. Criterion 27-Increase in environmental awareness.	and for the workers post occupancy with appropriate examples from GRIHA projects.
1430-1530	**Session-5: Sustainable Building Materials**	Criterion 19-Utilization of BIS recommended waste materials in building structure.	A detailed presentation shall be made on low-energy building materials and their implication in GRIHA with appropriate examples.
1530 – 1545	Tea Break		
1545 – 1730	**Session-5: Sustainable Building Materials (Contd.)**	Criterion 20-Reduction in embodied energy of building structure. Criterion 21-Use of low-environmental impact materials in building interiors.	Contd.
	Day III		
1000 – 1115	**Session-6: Energy Management**	Criterion 9-Renewable energy utilization. Criterion 10-Zero ODP materials	A detailed presentation shall be made on renewable energy integration in buildings and use of low Ozone Depleting Potential (ODP) materials with appropriate examples.
1115 – 1130	Tea Break		
1130 – 1215	**Session-6: Energy Management (contd.)**	Criterion 12-Maintaining good IAQ. Criterion 13-Use of low-VOC paints and other compounds in building interiors	A detailed presentation shall be made on maintaining good indoor air quality in the buildings and use of low – Volatile organic Compounds (VOC) paints and other materials in interiors.
1215 – 1300	**Session-7: Performance Metering and Monitoring**	Criterion 28- Smart metering and monitoring. Criterion 29-Operation, Maintenance Protocols.	A detailed presentation will be made on the importance of O&M protocols, smart metering and monitoring.

		Criterion 30-Performance Assessment for Final Rating. Criterion 31-Innovation	
1300 - 1400	Lunch Break		
1400 – 1715	**Session - 8:** **Water and Waste Management**	Criterion 14-Use of low-flow fixtures and systems. Criterion 15-Reducing landscape water demand. Criterion 16-Water Quality. Criterion 17- On-site water reuse. Criterion 18-Rainwater Recharge. Criterion 22-Avoid post-construction landfill. Criterion 23-Treat organic waste on site.	The facilitator shall give a detailed presentation on water, waste water and solid waste related issues and solutions through GRIHA. The presentation shall focus on management of waste and water in building sector with examples from current green building projects of GRIHA
1715-1730	**Session - 9**	Overview of GRIHA Certified Professional and Evaluator examination	
1730 - 1800	Tea + Closing + Feedback		

Day IV	
Time	Session
1000 - 1100	**Session 4:** Presentation on SVAGRIHA Rating System This session will deliver the overview of SVAGRIH A Rating system which is developed for small standalone buildings like residences, commercial offices, motels, dispensaries, schools etc. and/or set of buildings with a cumulative built-up area of 2500 sq.m. or less.
1100 - 1115	Tea/Coffee
1115 - 1300	**Session 5:** Presentation of SVAGRIHA Rating Tool This session will introduce the online tool which is designed to evaluate the performance of the project with respect to SVAGRIHA in a simple, easy to understand manner.
1300 - 1400	Lunch
1400 - 1530	**Session 7:** Introduction on GRIHA EB Rating system

	A detailed presentation will be made on how GRIHA EB tool can be used to evaluate performance and provide solutions for existing buildings based on the following criteria. Criteria 1:Site Parameters Criteria 2:Maintenance and Housekeeping Criteria 3:Social Aspects
1530 - 1545	Tea/Coffee
1545 - 1800	**Session 7 contd.:** Criteria 4:Energy Efficiency and Renewable Energy Utilization Criteria 5:Water Efficiency Criteria 6:Human Health & Comfort Criteria 7:Hands on training of GRIHA EB and feasibility check tool

Benefits of attending the Training Programme

Post attending the 3 Day Training Programme, the students will be eligible to appear for the **GRIHA Certified Professional Examination**. The process for the same is as follows:

Examination Process: After attending the programme, a User ID and password is shared with all participants enabling access to the GRIHA Community Portal. The examination is held once a month. It's an online examination which you can give from your home/office.

Syllabus and study material: The GRIHA Certified Professional Exam is based on GRIHA Version 2015. Candidates may refer the **GRIHA Version 2015 abridged manual** and the presentations given during the training program to prepare for the exam. The e-modules are provided to the candidates who complete the registration process.

Exam structure:

1. The GRIHA CP examination has 60 questions.
2. Maximum marks are 100.
3. The exam duration is 75 minutes.
4. The passing marks to become a GRIHA Certified Professional are 75.
5. There is NO negative marking
6. Full marks for questions will be given only when the following conditions are met:

   a. **Single Choice Questions:** Marks will be given only when the candidate selects the correct option and only one option. If more than one option is selected, the question will automatically be marked zero.

   b. **Multiple Choice Questions:** Full marks (2 or 3) will be given only when the candidate selects all right answers. If the candidate selects less/more options than the correct options or if even one of the selected options is incorrect, the question will be marked zero.

7. There are 3 sections in the question paper:

   a. **Section 1:** Single/Multiple Choice Questions (40 Questions). The candidate will have to assess for each question whether it will have 1/2/3 correct options and mark accordingly.

   b. **Section 2:** True and False (10 Questions)

   c. **Section 3:** Calculations (10 Questions)

Examination fee: Rs.1000/- per attempt.

Validity: The validity period is 2 years. The validity guidelines are under development.

GRIHA Certified Professionals can:

- Be a part of site visits for the GRIHA Projects
- Become a trainer for the Training Programmes/ Awareness Programmes
- Get a point under innovation if you are a team member of a project, registered under GRIHA
- Get discounts for various GRIHA events (National Summit, Regional Summit, workshops etc.)