Green Building Technology

(GR18A3128)

IV-B.Tech – I Semester

(2021-22)

by

Mr. POLINA VVSSR KRISHNA

Assistant Professor

Department of Civil Engineering

Gokaraju Rangaraju Institute of Engineering and Technology

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Green building Technology

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IV Year B. Tech. CE – I Semester L:2 T:1 P:0 C:3

UNIT-1

Concept of Green Buildings:

Definition of Green Buildings, typical features of green buildings, Necessity, Initiatives, Green buildings in India, Green building Assessment- Green Building Rating Systems (BREEAM,USGBC,LEED,IGBC,TERI-GRIHA, GREEN STAR),Criteria for rating, Energy efficient criteria ,environmental benefits economic benefits, health and social benefits , Major energy efficiency areas for building, Contribution of buildings towards Global Warming. Life cycle cost of buildings, Codes and Certification Programs

UNIT-II

Sources of Energy:

Renewable and Non-renewable sources of energy ; Coal, Petroleum, Nuclear, Wind, Solar, Hydro, Geothermal sources; potential of these sources, hazards, pollution; Global scenario with reference to demand and supply in India, Global efforts to reduce carbon emissions, Performance testing (new and existing): Building modeling , Energy analysis, Commissioning, Metering, Monitoring.

Carbon emission: Forecasting, Control of carbon emission, Air quality and its monitoring carbon foot print; Environmental issues, Minimizing carbon emission, Energy retrofits and Green Remodels.

UNIT-III

Green Building Materials: Sustainably managed Materials, Depleting natural resources of building materials; renewable and recyclable resources; energy efficient materials; Embodied Energy of Materials , Green cement, Biodegradable materials, Smart materials, Manufactured Materials, Volatile Organic Compounds (VOC's), Natural Non-Petroleum Based Materials, Recycled materials, Renewable and Indigenous Building Materials, Engineering evaluation of these materials.

Green Building Planning and Specifications: Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures, Green Strategies for Building Systems, Alternative Construction Methods, Energy Conservation Measures in Buildings, Waste &Water management and Recycling in Sustainable Facilities, Heating, Ventilation and Air Conditioning, Passive Solar & Daylight, Plumbing and its Effect on Energy Consumption

UNIT-IV

Design of Green Buildings; Sustainable sites, Impact of building on environment, Life cycle assessment, Principles of sustainable development in Building Design ,Design on Bioclimatic and solar passive architecture, Considerations of energy consumption, water use, and system reliability, indoor air quality, noise level, comfort, cost efficiency in building design, Advanced Green building technologies and innovations.

UNIT-V

Construction of Green Buildings: Energy efficient construction, Practices for thermal efficiency and natural lighting. Eco- friendly water proofing; ECB codes building rating, Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking, Green Project Management Methods and Best Practices, Cost/benefit analysis of green buildings,Life-cycle analysis of green buildings, Case studies of rated buildings (new and existing)

REFERENCE BOOKS:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkata Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPON Press
3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
4. Green Buildings (McGraw hill publication): by Gevorkian
5. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
6. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider ,W. W. Norton & Company Publisher.
7. Understanding Green Building Materials,Traci Rose Rider, W. W. Norton & Company Publisher.

List of free reference guides/resources available on the net:

1. IGBC reference guide
2. Free abridged versions of LEED reference guides
3. ECBC latest version
4. US GBC's Reference Material:

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Department of Civil Engineering

Time-Table AY: 2021-22 (I-Semester)

<table>
<tr><td colspan="2">Section: A</td><td colspan="3">IV Year</td><td colspan="3">wef: 01-09-2021</td></tr>
<tr><td>Day/Time</td><td>10:20-11:15</td><td>11:15-12:10</td><td>12:10-01:05</td><td>01:05-01:40</td><td>01:40-02:30</td><td>02:30-03:20</td><td>03:20-04:10</td></tr>
<tr><td>Monday</td><td colspan="2"></td><td></td><td rowspan="6">Lunch Break</td><td colspan="2"></td><td></td></tr>
<tr><td>Tuesday</td><td colspan="2"></td><td></td><td></td><td colspan="2">GBT</td></tr>
<tr><td>Wednesday</td><td></td><td colspan="2"></td><td colspan="2"></td><td>GBT</td></tr>
<tr><td>Thursday</td><td></td><td colspan="2"></td><td>GBT</td><td colspan="2">PME</td></tr>
<tr><td>Friday</td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>Saturday</td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>Course Code</td><td>Course Shortform</td><td colspan="2">Course Name</td><td colspan="3">Faculty Name (Short Code - Staff ID)</td></tr>
<tr><td>GR18A3128</td><td>GBT</td><td colspan="2">Green Building Technology</td><td colspan="3">Mr.PVVSSR Krishna (Mr.PVVSSRK-1562)</td></tr>
</table>

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

Time-Table AY: 2021-22 (I-Semester)

Section: B			**IV Year**			**wef: 01-09-2021**	
Day/Time	**10:20-11:15**	**11:15-12:10**	**12:10-01:05**	**01:05-01:40**	**01:40-02:30**	**02:30-03:20**	**03:20-04:10**
Monday				**Lunch Break**			
Tuesday							
Wednesday		GBT					
Thursday							
Friday	GBT						
Saturday	GBT						

Course Code	**Course Shortform**	**Course Name**	**Faculty Name (Short Code - Staff ID)**
GR18A3128	GBT	Green Building Technology	Mr.PVVSSR Krishna (Mr.PVVSSRK-1562)

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Programme Educational Objectives (PEO's)

1. Graduates of the programme will be successful career in technical and professional career.
2. Graduates of the programme will have proficiency in solving real time Civil Engineering projects.
3. Graduates of the programme will continue to engage in lifelong learning with ethical and social responsibility.

Program Outcomes (PO's)

Graduates of the Civil Engineering programme will be able to

a. apply knowledge of mathematics, science and fundamentals of Civil Engineering.
b. analyse problem and interpret the data.
c. design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
d. identify, formulate, analyse and interpret data to solve Civil Engineering problems.
e. use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
f. understand the impact of engineering solutions in a global, economic and societal context.
g. understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
h. understanding of professional and ethical responsibility.
i. work effectively as an individual or in a team and to function on multi-disciplinary context.
j. communicate effectively with engineering community and society.
k. demonstrate the management principles in Civil Engineering projects.
l. recognize the need for and an ability to engage in life-long learning.

Program Specific Outcomes (PSO's)

PSO1: Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.

PSO2: Create and develop innovative designs with new era materials through research and development.

Signature of HOD

Date:

Signature of faculty

Date:

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COURSE OBJECTIVES

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S. No	Course Objectives
1	To create awareness about the principles of green building technology and to have insight about the criteria for rating systems along with the established Indian codes and guidelines.
2	To get a clear understanding of various renewable and non-renewable sources of energy along with their carbon foot prints and also enumerate the process of performance testing including building modeling and energy analysis.
3	To discuss about the energy efficient green building materials and to have understanding on the cost effective Building Technologies, Strategies for GreenBuilding Systems and Energy Conservation Measures.
4	To describe the principles of sustainable development in green building design.
5.	To explain the best green building practices adopted along with cost/benefit and life-cycle analysis of green buildings.

Signature of HOD
Date:

Signature of faculty
Date:

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COURSE OUTCOMES

Academic Year : **2021-22** **Semester** : **I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

On completion of this Subject/Course the student shall be able to:

S. No	Course Outcomes
1	Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.
2	Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.
3	Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.
4	Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.Perform cost/benefit analysis and life-cycle analysis of green buildings.
5	Summarize on the building codes, relevant legislation governing the consumption of resources and emission of environmental pollutants by buildings and be familiar with IGBC green building certification procedure.

Signature of HOD Signature of faculty

Date: Date:

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B.Tech Civil Engg. IV Yr-I Sem- Section A Roll list- GR18 2021 -22

S.No	Reg No	Student Name
1	17241A0153	SUJITH KUMAR SHINDE
2	17241A0157	VUPPULA MITHUNKUMAR REDDY
3	18241A0101	AJMEERA GANESH
4	18241A0102	ANABOTULA SRAVANI
5	18241A0103	ANUMATLA MANOJ
6	18241A0104	BYNA RISHITHA
7	18241A0105	BURA THARASRI
8	18241A0106	PUDARI BADRINATH GOUD
9	18241A0107	BALASANI ROHITH
10	18241A0108	BANDARI VEERASWAMY
11	18241A0109	BANDI VARUN KUMAR
12	18241A0110	BASHIPAKA PRADEEP
13	18241A0111	BATHULA NIKHIL
14	18241A0112	BATIKIRI VEERENDRA SWAMY
15	18241A0113	BHUKYA SOUJANYA
16	18241A0114	BHUKYA VARUN NAIK
17	18241A0115	BODDU PAVAN
18	18241A0116	BYAGARI RANGARAJU
19	18241A0117	CHADA RUCHITA
20	18241A0118	CHINTHAKUNTLA THRIVEEN
21	18241A0119	CV JASWANTH SURYA
22	18241A0120	DOSAPATI NISHU
23	18241A0121	G PRASHANTH
24	18241A0122	GADDIPATI LOHITHA
25	18241A0123	GANGAM ROHIT REDDY
26	18241A0124	GOTTEMUKKALA GOVARDHAN
27	18241A0125	HRISHIKESH BANSAL
28	18241A0126	JANAPATI RAJU
29	18241A0127	JYOTHIKA MANNAVA
30	18241A0128	K HARSHITHA REDDY
31	18241A0129	KOLAN RESHIKESH REDDY
32	18241A0130	KARRI BHARATH CHANDRA REDDY
33	18241A0131	KUPPALA NIHAR
34	18241A0132	KURVA LAVANYA
35	18241A0133	MADDIMSETTY SRI CHARAN
36	18241A0134	MAGANOOR MANASWINI
37	18241A0135	MALOTH BHAVSINGH

38	18241A0136	MALOTHU NAVEENA
39	18241A0137	MANDA ITHIHAS
40	18241A0138	MOHAMMAD ASHFAQ AHMED
41	18241A0139	MOHAMMED OMER SHAREEF
42	18241A0140	MUKUNDU NAVEEN
43	18241A0141	NALUMASU SAHITHI
44	18241A0142	NAMPELLY RAVI KUMAR
45	18241A0143	NARRA SHASHIDHAR REDDY
46	18241A0144	PATLOLA VINAY REDDY
47	18241A0145	PATTAMBETTY PAVANKUMAR
48	18241A0146	POLA THARUN
49	18241A0147	POSANI S V A KALYAN
50	18241A0148	PULLE MANICHADRA
51	18241A0149	RAJULAPATI ROHIT NAGA SAI
52	18241A0150	SURA SUBBARAM REDDY
53	18241A0153	SUNKARI VIKAS
54	18241A0154	THIRUPATHI RAO SALLA
55	18241A0155	TRIVIKRAM REDDY
56	18241A0156	THRUPTI SHREYA
57	18241A0157	VAKAMALLA BHAVYA SREE
58	18241A0158	VEMULA MANISHA
59	18241A0159	VUPPULA KEERTHANA
60	18241A0160	YALLA ANITHA
61	19245A0101	KANCHERLA BHARATH
62	19245A0102	ELUPULA KUMARASWAMY
63	19245A0103	BRAHMADEVARA BHAVITHA
64	19245A0104	DASARI NAMRATHA
65	19245A0105	T CHANDANA
66	19245A0106	KOLA HARITHA

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B.Tech Civil Engg. IV Yr-I Sem- Section B Roll list - GR18 2021 -22

S.No	Reg No	Student Name
1	16241A0161	ABDUL SAMAD
2	18241A0161	A NACHIKETH
3	18241A0162	ALETI JAGADISH
4	18241A0163	AMIRNENI ANUSHA
5	18241A0164	ANIREDDY AVINASH
6	18241A0165	ASHITHA GOLLA
7	18241A0166	ANIMESH BAATHUK
8	18241A0167	BOPPU LOKESH
9	18241A0168	BUDAGAM HARSHITH
10	18241A0169	CHILUMULA SRIDHAR
11	18241A0170	DANDRE VENNELA
12	18241A0171	DOTI UPENDER
13	18241A0172	EDA MANASA
14	18241A0173	GONDA HARSHINI
15	18241A0174	GORE KAMALAKAR SAILESH
16	18241A0175	GORE KAMALAKAR SANDEEP
17	18241A0176	GUDDATI ARUN
18	18241A0177	VIJAY NARASIMHA REDDY KOLAGTLA
19	18241A0178	KANCHARAKUNTLA DEEPIKA
20	18241A0179	KOTA RASHMITHA
21	18241A0180	KOTHURI PRANAY
22	18241A0181	KUDALA RAMA
23	18241A0182	KUMMARI SRILEKHA
24	18241A0183	KUNCHALA ADARSH
25	18241A0184	KURRA NEERAJ PRASAD
26	18241A0185	KYAMA PAVAN
27	18241A0186	M SHEKHAR
28	18241A0187	MALRAJ MANVITHA
29	18241A0188	MATHARASI SAI KUMAR
30	18241A0189	MD AMEER SOHAIL
31	18241A0190	MD AMIR
32	18241A0191	MEDARI VIKRAM ADITYA
33	18241A0192	MEDIGA KARTHIK
34	18241A0193	MONIESH REDDY SUNKARA
35	18241A0194	KAUSHIK NADELLA
36	18241A0195	NIKHITHA KASUVOJULA
37	18241A0196	NUNAVATH SUMAN

38	18241A0197	P KISHORE
39	18241A0198	PEESU SPANDANA REDDY
40	18241A0199	PRATHYUSHA MADDALA
41	18241A01A0	BAVANARI PRATYUSH
42	18241A01A1	PUTTA ROHITH
43	18241A01A2	RAHUL PRADHAN
44	18241A01A3	RAMPELLI PRAVALIKA
45	18241A01A4	RANGU SONIYA
46	18241A01A5	RENTALA ADARSH REDDY
47	18241A01A6	RITISH J
48	18241A01A7	SEELAM RAHUL GOUD
49	18241A01A8	SHAIK AFEEZ
50	18241A01A9	SHAIK SHOAIB
51	18241A01B0	SHIVARATHRI SAI KUMAR
52	18241A01B1	SHIVARATHRI THARUN
53	18241A01B2	SOWMIKA BOYAPATI
54	18241A01B3	VISHRUTH REDDY T N
55	18241A01B4	TEKULA PRASHANTH REDDY
56	18241A01B5	TEEGALA SOMESHWAR REDDY
57	18241A01B6	THATIPAMULA VIGNA SAI
58	18241A01B7	THOTA SRI SAI
59	18241A01B8	VEDATI MANIKANTA KARTHIK
60	18241A01B9	VALLAPU REDDY SUSHRUTHA
61	18241A01C0	YANALA RITHISH REDDY
62	19245A0107	CHOUGONI SHIVASHANKAR
63	19245A0108	KOTA ANVESH
64	19245A0109	POLAGANI CHANDU GOUD
65	19245A0110	SADGARI KARTHIK
66	19245A0111	GUGULOTHU PAVAN
67	19245A0112	A RAGHAVENDRA

Signature of HOD

Date:

Signature of faculty

Date:

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GUIDELINES TO STUDY THE COURSE SUBJECT

Academic Year : 2021-2022 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Guide line to study the course/subject: Green Building Technology

This course helps the students to learn and understand about history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines. .

So the students should have the following prerequisites:

- Basic knowledge of Environment, energy
- Basic knowledge of construction methods and materials

Where will this subject help?

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.
- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

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BOOKS AND MATERIALS

Books and Codes	
1.	Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkata Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2.	Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
3.	IGBC Rating systems

Web Sites	
4.	**https://igbc.in/igbc/** **https://en.wikipedia.org/wiki/Energy_Conservation_Building_Code** **https://www.youtube.com/watch?v=YBda5a2a9QQ&t=201s** **https://www.youtube.com/watch?v=RocreN7_sqs**

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COURSE DESIGN AND DELIVERY SYSTEM (CDD)

- The Course syllabus is written into number of learning objectives and outcomes.
- These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.
- Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
- The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

- Understand the principles of Learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, unit and lesson plans
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback to students using various methods of Assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD Signature of faculty

Date:

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COURSE SCHEDULE

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. Of Periods
		From	To	
1.	I-Unit: Concept of green buildings	17/08/21	08/09/21	13
2.	II-Unit: Sources of Energy &Carbon emission	09/09/21	12/10/21	19
3.	III-Unit: Green Building Materials	25/02/22	25/03/22	17
4.	IV-Unit: Design of Green buildings	16/11/21	24/11/21	07
5.	V-Unit: Construction of Green Buildings	25/11/21	08/12/21	09
		Total Periods		65

1. Total No. of Instructional periods available for the course: **65** Hours / Periods

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Department of Civil Engineering

SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic Year: 2021– 22 **Branch:** B. Tech Civil Engineering

Subject: Green Building Technology **Class:** IV Year A Section **Sem:** I

Faculty Name: PVVSSR KRISHNA (1562)

S.No	Date	Unit No.	Session Duration 50min)	Topics
	Unit-I	I	**Concept of green buildings**	
1	17-08-21		1	Introduction to Green building technology, Definition of Green Buildings
2	19-08-21		1	Introduction to Green building technology, Definition of Green Buildings
3	20-08-21		1	Typical features of green buildings, Necessity &Initiatives of green buildings
4	24-08-21		1	Green buildings in India, Green building Assessment, Green Building Rating Systems
5	26-08-21		1	Green buildings in India, Green building Assessment, Green Building Rating Systems
6	27-08-20		1	IGBC Rating systems, BREEAM Rating system
7	31-08-21		1	LEED Rating system, GRIHA Rating system
8	01-09-21		1	Criteria for rating, Energy efficient criteria
9	02-09-21		1	Environmental &economic benefits, health and social benefits, Major energy efficiency areas for building
10	07-09-21		2	Contribution of buildings towards Global Warming, Goals of green buildings
11	08-09-21		1	Life cycle cost of buildings
	Unit-II		**Sources of Energy &Carbon emission**	
12	09-09-21	II	1	Renewable sources of energy
13	14-09-21		2	Non-renewable sources of energy
14	15-09-21		1	Geothermal sources, potential of these sources

15	16-09-21		1	Global scenario with reference to demand and supply in India
16	21-09-21		2	Global efforts to reduce carbon emissions
17	22-09-21		1	Global efforts to reduce carbon emissions
18	23-09-21		1	Performance testing&Building modeling
19	28-09-21		2	Energy analysis, Commissioning
20	29-09-21		1	Energy Metering,Monitoring
	UNIT-II		**Carbon emission**	
21	30-09-21		1	Forecasting carbon emission, Control of carbon emission
22	05-10-21		2	Air quality and its monitoring, carbon foot print
23	06-10-21		1	carbon foot print
24	07-10-21		1	Environmental issues, Minimizing carbon emission
25	12-10-21		2	Energy retrofits, Green Remodels
	Unit-III		**Green Building Materials**	
26	13-10-21		1	Sustainably managed Materials
27	14-10-21		1	Depleting natural resources of building materials
28	19-10-21		2	renewable and recyclable resources, energy efficient materials
29	20-10-21		1	Embodied Energy of Materials
30	21-10-21		1	Green cement, Biodegradable materials, Smart materials
31	26-10-21		2	Manufactured Materials, Volatile Organic Compounds, Recycled materials
32	27-10-21		1	Renewable and Indigenous Building Materials
33	28-10-21		1	Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures
34	02-11-21		2	Green Strategies for Building Systems, Alternative Construction Methods
35	03-11-21		1	Green Strategies for Building Systems
36	09-11-21		2	Energy Conservation Measures in Buildings Waste &Water management and Recycling in Sustainable Facilities, Heating, Ventilation and Air Conditioning
37	10-11-21		1	Heating, Ventilation and Air Conditioning
38	11-11-21		1	Passive solar design
	Unit-IV		**Design of Green buildings**	
39	16-11-21		2	Sustainable sites, Impact of building on environment
40	17-11-21		1	Life cycle assessment
41	18-11-21		1	Principles of sustainable development in Building Design
42	23-11-21		2	Indoor air quality, noise level, comfort, cost efficiency in building design
				Design on Bioclimatic and solar passive architecture,

43	24-11-21		1	Advanced Green building technologies and innovations
	UNIT-V		**Construction of Green Buildings**	
44	25-11-21		1	Energy efficient construction
45	26-11-21		1	Practices for thermal efficiency and Natural lighting
46	30-11-21		2	Eco- friendly water proofing, ECB codes building rating
47	01-12-21		1	Maintenance of green buildings, Cost and Performance Comparisons
48	02-12-21		1	Cost and Performance Comparisons and Benchmarking
49	07-12-21		2	Green Project Management Methods and Best Practices,
50	08-12-21		1	Cost/benefit analysis of green buildings
			II MID EXAMINATIONS	

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

COURSE SCHEDULE

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. Of Periods
		From	To	
1.	I-Unit: Concept of green buildings	16/08/21	04/09/21	12
2.	II-Unit: Sources of Energy &Carbon emission	08/09/21	13/10/21	18
3.	III-Unit: Green Building Materials	20/10/21	12/11/21	15
4.	IV-Unit: Design of Green buildings	13/11/21	24/11/21	07
5.	V-Unit: Construction of Green Buildings	26/11/21	08/12/21	08
		Total Periods		60

1. Total No. of Instructional periods available for the course: **60** Hours / Periods

Academic Year: 2021– 22 **Branch:** B. Tech Civil Engineering

Subject: Green Building Technology **Class:** IV Year B Section **Sem:** I

Faculty Name: PVVSSR KRISHNA (1562)

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S.No	Date	Unit No.	Sessions	Topics
	Unit-I		**Concept of green buildings**	
1	16-08-21		1	Introduction to Green building technology, Definition of Green Buildings
2	17-08-21		1	Typical features of green buildings
3	21-08-21		1	Necessity &Initiatives of green buildings
4	23-08-21		1	Green buildings in India, Green building Assessment, Green Building Rating Systems
5	24-08-21	I	1	Green Building Rating Systems
6	28-08-21		1	IGBC Rating systems, BREEAM Rating system
7	30-08-21		1	LEED Rating system, GRIHA Rating system
8	31-08-21		1	Criteria for rating, Energy efficient criteria
9	01-09-21		2	Environmental &economic benefits, health and social benefits, Major energy efficiency areas for building
10	03-09-21		1	Contribution of buildings towards Global Warming, Goals of green buildings
11	04-09-21		1	Life cycle cost of buildings
	Unit-II		**Sources of Energy &Carbon emission**	
12	8-09-21		1	Renewable sources of energy
13	11-09-21		1	Non-renewable sources of energy
14	15-09-21		2	Geothermal sources, potential of these sources
15	17-09-21		1	Global scenario with reference to demand and supply in India
16	18-09-21		1	Global efforts to reduce carbon emissions
17	22-09-21		2	Performance testing&Building modeling
18	24-09-21		1	Energy analysis, Commissioning
19	25-09-21	II	1	Energy Metering,Monitoring
	UNIT-II		**Carbon emission**	
20	29-09-21		2	Forecasting carbon emission
21	01-10-21		1	Control of carbon emission
22	06-10-21		2	Air quality and its monitoring,
23	08-10-21		1	carbon foot print
24	09-10-21		1	Environmental issues, Minimizing carbon emission
25	13-10-21		1	Energy retrofits, Green Remodels
	Unit-III		**Green Building Materials**	
26	20-10-21		2	Sustainably managed Materials, Depleting natural resources of building materials
27	22-10-21		1	renewable and recyclable resources
				energy efficient materials, Embodied Energy of Materials

28	23-10-21		1	
29	27-10-21		2	Green cement, Biodegradable materials
30	29-10-21		1	Smart materials, Manufactured Materials
31	30-11-21		1	Volatile Organic Compounds, Recycled materials Renewable and Indigenous Building Materials
32	03-11-21		2	Environment friendly and cost effective Building Technologies
33	05-11-21		1	Integrated Life cycle design of Materials and Structures
34	06-11-21		1	Green Strategies for Building Systems, Alternative Construction Methods, Green Strategies for Building Systems
35	10-11-21		2	Energy Conservation Measures in Buildings Waste &Water management and Recycling in Sustainable Facilities,
36	12-11-21		1	Heating, Ventilation and Air Conditioning,Passive solar design
	Unit-IV		**Design of Green buildings**	
37	13-11-21		1	Sustainable sites, Impact of building on environment
38	17-11-21		2	Life cycle assessment, Principles of sustainable development in Building Design
39	19-11-21		1	Indoor air quality, noise level, comfort, cost efficiency in building design
40	20-11-21		1	Advanced Green building technologies and innovations
41	24-11-21		2	Design on Bioclimatic and solar passive architecture, Advanced Green building technologies and innovations
	UNIT-V		**Construction of Green Buildings**	
42	26-11-21		1	Energy efficient construction, Practices for thermal efficiency and Natural lighting
43	27-11-21		1	Eco- friendly water proofing, ECB codes building rating
44	01-12-21		2	Maintenance of green buildings, Cost and Performance Comparisons and Benchmarking
45	03-12-21		1	Green Project Management Methods and Best Practices
46	04-12-21		1	Cost/benefit analysis of green buildings
47	08-12-21		2	Case studies of rated buildings
			II MID EXAMINATIONS	

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

UNIT PLAN

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S.No	Date	Unit No.	Sessions	Topics
	Unit-I	I	**Concept of green buildings**	
1	16-08-21		1	Introduction to Green building technology, Definition of Green Buildings
2	17-08-21		1	Typical features of green buildings
3	21-08-21		1	Necessity &Initiatives of green buildings
4	23-08-21		1	Green buildings in India, Green building Assessment, Green Building Rating Systems
5	24-08-21		1	Green Building Rating Systems
6	28-08-21		1	IGBC Rating systems, BREEAM Rating system
7	30-08-21		1	LEED Rating system, GRIHA Rating system
8	31-08-21		1	Criteria for rating, Energy efficient criteria
9	01-09-21		2	Environmental &economic benefits, health and social benefits, Major energy efficiency areas for building
10	03-09-21		1	Contribution of buildings towards Global Warming, Goals of green buildings
11	04-09-21		1	Life cycle cost of buildings

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

UNIT PLAN

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S.No	Date	Unit No.	Sessions	Topics
	Unit-II		**Sources of Energy &Carbon emission**	
1	09-09-21	II	1	Renewable sources of energy
2	14-09-21		2	Non-renewable sources of energy
3	15-09-21		1	Geothermal sources, potential of these sources
4	16-09-21		1	Global scenario with reference to demand and supply in India
5	21-09-21		2	Global efforts to reduce carbon emissions
6	22-09-21		1	Global efforts to reduce carbon emissions
7	23-09-21		1	Performance testing&Building modeling
8	28-09-21		2	Energy analysis, Commissioning
9	29-09-21		1	Energy Metering,Monitoring
	UNIT-II		**Carbon emission**	
10	30-09-21		1	Forecasting carbon emission, Control of carbon emission
11	05-10-21		2	Air quality and its monitoring, carbon foot print
12	06-10-21		1	carbon foot print
13	07-10-21		1	Environmental issues, Minimizing carbon emission
14	12-10-21		2	Energy retrofits, Green Remodels

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

UNIT PLAN

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S.No	Date	Unit No.	Sessions	Topics
	Unit-III		**Green Building Materials**	
1	13-10-21		1	Sustainably managed Materials
2	14-10-21		1	Depleting natural resources of building materials
3	19-10-21		2	renewable and recyclable resources, energy efficient materials
4	20-10-21		1	Embodied Energy of Materials
5	21-10-21		1	Green cement, Biodegradable materials, Smart materials
6	26-10-21		2	Manufactured Materials, Volatile Organic Compounds, Recycled materials
7	27-10-21		1	Renewable and Indigenous Building Materials
8	28-10-21		1	Environment friendly and cost effective Building Technologies, Integrated Life cycle design of Materials and Structures
9	02-11-21		2	Green Strategies for Building Systems, Alternative Construction Methods
10	03-11-21		1	Green Strategies for Building Systems
11	09-11-21		2	Energy Conservation Measures in Buildings Waste &Water management and Recycling in Sustainable Facilities, Heating, Ventilation and Air Conditioning
12	10-11-21		1	Heating, Ventilation and Air Conditioning
13	11-11-21		1	Passive solar design

Gokaraju Rangaraju Institute of Engineering and Technology
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UNIT PLAN

Academic Year : **2021-22** **Semester** : **I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S.No	Date	Unit No.	Sessions	Topics
	Unit-IV		**Design of Green buildings**	
1	16-11-21		2	Sustainable sites, Impact of building on environment
2	17-11-21		1	Life cycle assessment
3	18-11-21		1	Principles of sustainable development in Building Design
4	23-11-21		2	Indoor air quality, noise level, comfort, cost efficiency in building design
5	24-11-21		1	Design on Bioclimatic and solar passive architecture, Advanced Green building technologies and innovations

Gokaraju Rangaraju Institute of Engineering and Technology
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Bachupally, Kukatpally, Hyderabad – 500 090, India

UNIT PLAN

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

S.No	Date	Unit No.	Sessions	Topics
	UNIT-V		**Construction of Green Buildings**	
1	25-11-21		1	Energy efficient construction
2	26-11-21		1	Practices for thermal efficiency and Natural lighting
3	30-11-21		2	Eco- friendly water proofing, ECB codes building rating
4	01-12-21		1	Maintenance of green buildings, Cost and Performance Comparisons
5	02-12-21		1	Cost and Performance Comparisons and Benchmarking
6	07-12-21		2	Green Project Management Methods and Best Practices,
7	08-12-21		1	Cost/benefit analysis of green buildings

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090, India

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 1 Duration of Lesson: 50min

Lesson Title : Introduction to green building technology

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Learn about green buildings

TEACHING AIDS : Blackboard,Projector
TEACHING POINTS :

Green, Environment

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 2 Duration of Lesson: 50min

Lesson Title : typical features of green buildings

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. about the principles of green building technology

TEACHING AIDS : Blackboard,Projector

TEACHING POINTS :

Features, Green buildings

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 3&4 Duration of Lesson: 50min

Lesson Title : , Necessity, Initiatives

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

2. about the principles of green building technology

TEACHING AIDS : Blackboard,Projector

TEACHING POINTS :

Features, Green buildings

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 5& 6 Duration of Lesson: 50min

Lesson Title : Green buildings in India

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. about the principles of green building technology

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Case studies of green buildings in india

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

LESSON PLAN

Academic Year : 2021-22
Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 7 Duration of Lesson: 50min

Lesson Title : Green Building Rating Systems IGBC

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Have insight about the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Indian Green Building Council

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2019-20
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 8 Duration of Lesson: 50min

Lesson Title : Green Building Rating Systems (BREEAM, ,TERI-GRIHA, GREEN STAR)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Have insight about the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

BREEAM,GRIHA

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2019-20
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 9 Duration of Lesson: 50min

Lesson Title : Green Building Rating Systems (BREEAM, ,TERI-GRIHA, GREEN STAR)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Have insight about the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

BREEAM,GRIHA

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2019-20
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 10 Duration of Lesson: 50min

Lesson Title : Green Building Rating Systems (BREEAM, ,TERI-GRIHA, GREEN STAR)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

2. Have insight about the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

BREEAM,GRIHA

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : **2019-20**
Semester : **I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 11 Duration of Lesson: 50min

Lesson Title : Green Building Rating Systems (BREEAM, ,TERI-GRIHA, GREEN STAR)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

3. Have insight about the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

BREEAM,GRIHA

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 12 Duration of Lesson: 50min

Lesson Title : Energy efficient criteria

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Know principles, history, environmental and economic benefits of green building technology

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy efficiency

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 13 Duration of Lesson: 50min

Lesson Title : environmental benefits economic benefits, health and social benefits

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Know principles, history, environmental and economic benefits of green building technology

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

environmental benefits economic benefits

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos.

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : **2021-22**

Semester : **I**

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 14&15 Duration of Lesson: 50min

Lesson Title : Contribution of buildings towards Global Warming. Goals

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Reduce the global warming through the green buildings

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Goals of green building

Assignment / Questio

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 16 Duration of Lesson: 50min

Lesson Title : . Life cycle cost of buildings

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know the best green building practices adopted along with cost/benefit and life-cycle analysis of green buildings.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Life cycle cost

Assignment / Questio

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 17 Duration of Lesson: 50min

Lesson Title : Renewable sources of energy

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Renewable sources

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 18&19 Duration of Lesson: 50min

Lesson Title : Non-renewable sources of energy

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Non renewable sources

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 20 Duration of Lesson: 50min

Lesson Title : Coal, Petroleum, Nuclear, Wind, Solar, Hydro

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Sources of energy

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 21 Duration of Lesson: 50min

Lesson Title : Geothermal sources; potential of these sources, hazards, pollution

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Sources of energy

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 22&23 Duration of Lesson: 50min

Lesson Title : Global scenario with reference to demand and supply in India

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Efforts to reduce carbon emission

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 24 Duration of Lesson: 50min

Lesson Title : Global efforts to reduce carbon emissions,

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Efforts to reduce carbon emission

Assignment / Questions:

Signature of faculty

Note: Mention for each question the relevant Objectives and Outcomes Nos..

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 25 Duration of Lesson: 50min

Lesson Title : Global efforts to reduce carbon emissions

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Model the building

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Building modelling

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 26 Duration of Lesson: 50min

Lesson Title : Performance testing (new and existing): Building modeling

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Model the building

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Building modelling

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 27&28 Duration of Lesson: 50min

Lesson Title : Energy analysis, Commissioning

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Perform energy analysis

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy analysis

Assignment / Questions:

Signature of facult

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 29 Duration of Lesson: 50min

Lesson Title Energy Metering,Monitoring

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Monitor Energy and its metering

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy analysis

Assignment / Questions:

Signature of facult

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 30&31 Duration of Lesson: 50min

Lesson Title : : Air quality and its monitoring

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Know the air quality and its monitoring

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Air quality

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 32 Duration of Lesson: 50min

Lesson Title : : Carbon footprint

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:
Calculate carbon footprint

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Carbon emission

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 33 Duration of Lesson: 50min

Lesson Title : : Forecasting, Control of carbon emission

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Carbon emission

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 34&35 Duration of Lesson: 50 min

Lesson Title : Minimizing carbon emission, Energy retrofits and Green Remodels.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Energy retrofit and green remodels

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 36&37 Duration of Lesson: 50min

Lesson Title : Sustainably managed Materials, Depleting natural resources of building materials

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Materials, depleting natural resources

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 38 Duration of Lesson: 50min

Lesson Title : energy efficient materials

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy efficient materials

Assignment / Questions:

Signature of faculty

LESSON PLAN

Academic Year : 2021-22

Semester : I
Name of the Program : B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 39 Duration of Lesson: 50min

Lesson Title : Embodied Energy of Materials

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Embodied energy

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 40 Duration of Lesson: 50min

Lesson Title : Green cement, Biodegradable materials

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Embodied energy

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 41 Duration of Lesson: 50min

Lesson Title : Smart materials

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Smart materials

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 42&43 Duration of Lesson: 50min

Lesson Title : Renewable and Indigenous Building Materials, Engineering evaluation of these materials.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Evaluation of all energy efficient materials

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 44 Duration of Lesson: 50min

Lesson Title : Engineering evaluation of these materials.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Evaluation of all energy efficient materials

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22
Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 45 Duration of Lesson: 50min

Lesson Title : Environment friendly and cost effective Building Technologies

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.
- Explain the application of design guidelines of Green Building considering the Energy Conservation Measures

.TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Cost effective buildings

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 46 Duration of Lesson: 50 min

Lesson Title : Green Strategies for Building Systems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Strategies

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 47&48 Duration of Lesson: 50min

Lesson Title : Alternative Construction Methods,
Energy Conservation Measures in Buildings

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy conservation measures

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 27 Duration of Lesson: 50min

Lesson Title : Heating, Ventilation and Air Conditioning

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

HVAC systems

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 49 Duration of Lesson: 50 min

Lesson Title : Passive Solar & Daylight, Plumbing and its Effect on Energy Consumption

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.

TEACHING AIDS : Blacboard,projector
TEACHING POINTS :

Plumbing ,passive solar and daylight

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2019-20 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR15A4161

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 50 Duration of Lesson: 50 min

Lesson Title : Sustainable sites, Impact of building on environment

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Projector, Demonstration

TEACHING POINTS :

Sustainability,impacts

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 51 Duration of Lesson: 50min

Lesson Title : Sustainable sites, Impact of building on environment

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.

TEACHING AIDS : Projector, Demonstration

TEACHING POINTS :

Sustainability,impacts

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 52 Duration of Lesson: 50 min

Lesson Title : Principles of sustainable development in Building Design INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures.
- Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

sustainable development

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 53 Duration of Lesson: 50min

Lesson Title : Design on Bioclimatic and solar passive architecture

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Bioclimatic and passive

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 54 Duration of Lesson: 50min

Lesson Title : Considerations of energy consumption, water use, and system reliability, indoor air quality

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Summarize on the building codes, relevant legislation governing the consumption of resources and emission of environmental pollutants by buildings

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy consumption

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 55&56 Duration of Lesson: 50min

Lesson Title Design on Bioclimatic and solar passive architecture. Indoor air quality, noise level, comfort, cost efficiency in building design

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

To design green building considering indoor air quality, noise level, Cost efficiency in building design

TEACHING AIDS : Blacboard,projector

Indoor air quality

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 57 Duration of Lesson: 50min

Lesson Title : Advanced Green building technologies and innovations.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures

TEACHING AIDS : Blacboard,projector

Green building technologies and innovations

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 58 Duration of Lesson: 50min

Lesson Title : Energy efficient construction

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation MeasuresTEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Energy efficient construction

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 59 Duration of Lesson: 50min

Lesson Title: Eco- friendly water proofing; ECB codes building rating

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Eco- friendly water proofing

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 60 Duration of Lesson: 50min

Lesson Title: , ECB codes building rating

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Use ECBcodes for building rating

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

ECB codes

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraj Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 61 Duration of Lesson: 50min

Lesson Title: Cost and Performance Comparisons and Benchmarking

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Understand about Cost and Performance Comparisons and Benchmarking

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Benchmarking of green buildings

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 62&63 Duration of Lesson: 50min

Lesson Title: Green Project Management Methods and Best Practices,

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Understand about Green Project Management methods and best practices.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Best practices in green buildiongs

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 64 Duration of Lesson: 50min

Lesson Title: Cost/benefit analysis of green buildings

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Perform cost/benefit analysis and life-cycle analysis of green buildings.

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Cost/benefit analysis

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Lesson No : 65 Duration of Lesson: 50min

Lesson Title: life-cycle analysis of green buildings.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

- Perform cost/benefit analysis and life-cycle analysis of green buildings..

TEACHING AIDS : Blacboard,projector

TEACHING POINTS :

Eco- friendly water proofing

Assignment / Questions:

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

COURSE COMPLETION STATUS

Academic Year : 2021-22 **Date:**

Semester : I

Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
UNIT - I	Covered on time	1	1
UNIT - II	Covered on time	2	2
UNIT - III	Covered on time	3	3
UNIT – IV	Covered on time	4	4
UNIT - V	Covered on time	5	5

Signature of HOD Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

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EVALUATION STRATEGY

Academic **Y**ear : **2021-22**

Semester : I

Name of the Program: B.Tech Civil Engineering Year: IV Section: A&B

Course/Subject: Green Building technology Course Code: GR18A3128

Name of the Faculty: PVVSSR KRISHNA Dept.: Civil Engineering

Designation: Assistant Professor.

1. TARGET:

A) Percentage for pass: 90%

b) Percentage of class:

Total Strength: 133

S. No.	Class / Division	No. of Students
1	First Class with distinction	90
2	First Class	30
3	Pass Class	13

2. COURSE PLAN & CONTENT DELIVERY

S.No	Plan	Brief Description
1	Practice classes	65 Theory classes for Section A, B
2	Assignments	Assignments for the related concepts

3. **METHOD OF EVALUATION**

3.1 ☐ Continuous Assessment Examinations (CAE-I, CAE-II)

3.2 ☐ Assignments/Seminars

3.3 ☐ Mini Projects

3.4 ☐ Quiz

3.5 ☐ Semester/End Examination

3.6 ☐ Others

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

Signature of HOD
Date:

Signature of faculty
Date:

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Assessment in relation to CO's and COB's

MAPPING

Assessment:

1.Assignment
2.Internal Examination
3.External examinations
4.practicalprojects
5.Viva

GR18A3128/ Green building technology	**Course objectives**				
Assessments	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

GR18A3128/ Green building technology	**Course Outcomes**				
Assessments	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

GR18A3128/ Green building technology	**Course Outcomes**				
Course Objectives	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

Assignment-1

1.Explain about the type of rating from IGBC and features of the following Hyderabad metro stations?

Roll no 18-161-170, JNTU&KPHB

Roll no 18-171-180 Khairatabad and secunderabad west

Roll no 18-181-190 Jubilee hills check post and Hitech city

Roll no 18-191-1A0 Miyapur and Ameerpet

Roll no 18-1A1-1B0 MGBS and Panjagutta

Roll no 18-1B1-1C0, LE-6 to LE-12 Parade grounds and secunderabad East

Assignment-2

1.What are the types of eco friendly water proofing materials

Assignment-3

1.Explain briefly about Energy efficient materials

2.Write a short note on smart materilas

Assignment-IV

1. What are the alternative construction methods available for green buildings?

Assignment-V

1. Illustrate briefly about case studies of rated buildings both new and existing in India?

Tutorial-1

1.Describe about the features of any two existing green buildings in India?

Tutorial-2

2.What is global warming and elaborate about the contribution of building towards it?

Tutorial-3

1.Write about any two Green building materials which are recyclable in detail

Tutorial-4

1.Explain about the cost benefit analysis of green buildings?

Tutorial-5

1.In detail explain Factore affecting sustainable development

RUBRIC TEMPLATE

Academic Year : 2021-22 **Semester : I**
Name of the Program: B.Tech **Year: IV Year**

Course/Subject : Green building Technology **Course Code** : GR18A3128

Name of the Faculty : Mr. POLINA VVSSR KRISHNA

Designation: Assistant Professor **Department:** Civil Engineering

Objective: To learn basics and concepts of Green building technology.

Student Outcome: Learn IGBC rating systems, energy efficient materials, cost effective building Technologies , carbon footprints

			Beginning	**Developing**	**Reflecting Development**	**Accomplished**	**Exemplary**	**Score**
S.No	**Roll no**	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
1	**18241A01A0**	The level of knowledge on IGBC Rating systems	Low level of knowledge on IGBC Rating systems	Able to discuss the IGBC Rating systems	Ability to explain the IGBC Rating systems	Full knowledge on IGBC Rating systems	Analysing and implementing the knowledge IGBC Rating systems	4
		The level of knowledge on Energy efficient materials and construction technologies	Low level of knowledge on Energy efficient materials and construction technologies	Able to discuss types Energy efficient materials and construction technologies	Ability to explain types of Energy efficient materials and construction technologies	Full knowledge on Energy efficient materials and construction technologies	Analysing and application Energy efficient materials and construction technologies	4
		The level of knowledge on Indoor air quality,cost effective building technologies	Low level of knowledge on Indoor air quality,cost effective building technologies.	Ability to discuss and to study the Indoor air quality,cost effective building technologies .	Ability to explain Indoor air quality,cost effective building technologies.	Full knowledge on Indoor air quality,cost effective building technologies.	Analysing and implementing the knowledge Indoor air quality,cost effective building technologies .	4
							Average Score	4

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CO-PO MAPPING

GR18A3128/Green building technology	Program Outcomes													
Course Outcomes	a	b	c	d	e	f	g	h	i	j	k	l	PSO1	PSO2
Know the underlying principles, history, environmental and economic impacts of green building technology and to identify the criteria for rating systems along with the established Indian codes and guidelines.		M	H	H		M	H	M					M	M
Identify various Renewable and Non-renewable sources of energy along with their carbon foot prints and also comprehend the techniques and benefits of building performance testing such as building modeling and energy analysis, monitoring and metering.					M		H	M	H	M			H	
Recognize the energy efficient green building materials and explain the cost effective Building Technologies, Strategies for Green Building Systems and Energy Conservation Measures and compare cost and performance of building materials with recycled components, non-petroleum based materials, materials with low volatile organic compounds, materials with low embodied energy and salvaged materials and incorporate them into design.	M			M		M	H					M	H	M
Explain the application of design guidelines of Green Building considering the Energy Conservation Measures.Perform cost/benefit analysis and life-cycle analysis of green buildings.	H	M		M			M		M		H			M
Having a broad perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course.		H	H	H		M	M	M		M		M	M	H

CODE: GR15A4161 | GR 15 | SET - 3

IV B. Tech I Semester Regular Examinations, Nov/Dec 2019

Green Building Technologies

(Civil Engineering)

Time: 3 hours **Max Marks: 70**

PART – A

Answer ALL questions. All questions carry equal marks.

*****

10 * 2 Marks = 20 Marks

1). a	List any four Green Building Rating Systems.	[2]
b	Suggest any two low energy alternatives to burn Bricks.	[2]
c	Define Energy Retrofits.	[2]
d	Write the purpose of Ventilation with examples.	[2]
e	What is the purpose of Insulation?	[2]
f	List the factors considered for Building Orientation.	[2]
g	What is BREEAM?	[2]
h	Give any two examples of Mechanical Devices to control heat in Buildings.	[2]
i	Mention any two mandatory rules in GRIHA related to Construction.	[2]
j	Define Energy Efficient Materials.	[2]

PART – B

Answer any FIVE questions. All questions carry equal marks.

*****

5 * 10 Marks = 50 Marks

2. a) Define Green Building. Explain why Green Buildings are necessary. **[10]**

b) What are the criteria's for a Building to be rated as one star, two-star, three-star, four star and five star as per GRIHA?

3. Explain Energy Scenario in India and also the trends and pattern of Energy Consumption in India. **[10]**

4. Write short notes on: **[10]**

a) Green Cement b) Volatile Organic Compounds

CODE: GR15A4161

GR 15

SET - 3

5. What is Greenhouse Effect? Explain briefly the sources and the effects of Greenhouse Gases. [10]

6. Explain about life-cycle analysis of Green Buildings with the help of a case study. [10]

7. a) Write detailed notes on eco-friendly Materials for Green Buildings. [10]

   b) Explain the alternative technologies used in Green Building.

8. a) Explain the effect of Global Warming. [10]

   b) Explain contributions of Buildings towards Global Warming.

*****

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
IV B.Tech, I Sem, I MID-Term Examinations, October 2021
GREEN BUILDING TECHNOLOGY (GR18A3128)
Department of Civil Engineering

Duration: 90min MAX Marks: 15 Marks

SUBJECTIVE

Answer any three Out of Four **3*5 = 15 Marks**

Question No.		Marks	Blooms Levels*	Course Outcome
1	Discuss about the various types of Green building rating systems in India.	5M	BL5	CO1
2	Describe in detail about Renewable and Non-renewable sources of Energy	5M	BL3	CO2
3	Explain in detail about Carbon footprint.	5M	BL2	CO2
4	Write a short note on Energy efficient materials and Embodied energy of materials and also discuss about various energy efficient materials	5M	BL1	CO3

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING
IV B.TECH. I SEM., II MID-TERM EXAMINATION, DEC-2021
GREEN BUILDING TECHNOLOGY(GR18A3128)

Date: 13/12/2021 Time: 90 min
Max. Marks: 15

Answer any **three**

Question No.		Marks	Blooms Levels*	Course Outcome
1	Explain about Passive solar system design for Buildings?	5M	BL2	CO3
2	Write a detailed notes on Environment friendly and cost effective building technologies ?	5M	BL1	CO4
3	Discuss briefly the Principles of sustainable development in building design?	5M	BL5	CO5
4	Write about the Engineering evaluation of building materials?	5M	BL1	CO3

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

IV B.TECH. I SEM., I MID-TERM EXAMINATION, October-2021

GREEN BUILDING TECHNOLOGY(GR18A3128)

Time: 10 min Max. Marks: 5

Name: **Roll No.**

I Multiple choice Questions

1. Sustainable building design include... [ ]
   A) Energy conservation. B) Brick wall construction.
   C) Town Planning. D) plastering of walls
2. Green building practices include [ ]
   A) Energy Efficiency B) Recycled materials
   C) Environmental protection D) All of the above
3. Which of the following is considered as a non renewable energy source? [ ]
   A) wind B) Solar C) Tidal D) Petroleum
4. Which of the following rating system for green buildings was formed as a part of Confederation of Indian Industry(CII)... [ ]
   A) IGBC B) USGBC. C) LEED. D) GRIHA
5. Straw bales used for building insulation is _____. [ ]
   A) A rapidly renewable building material
   B) A recycled-content building
   C) Smart Material
   D) None of the above
6. Gold Rating given for buildings in IGBC Stands for [ ]
   A) Best practices B) Outstanding performance
   C) National excellence D) Global leadership
7. During the manufacture of cement, CO_2 emission per 1kg manufacture of cement in terms of Co2 equivalent [ ]
   A) 100 grams B) 700 grams C) 1000 grams D) 800 grams
8. Self healing material is one of _____ materials [ ]
   A) Smart B) Energy efficient
   C) Sustainable D) Volatile organic
9. Ozone-depleting substances are commonly found in which products? [ ]
   A) Paints B) Refrigerants C) Household appliances D) None
10. Salvaging of bricks and stones from an old building for use in a new building is an example of what type of practice? [ ]
    A) Reusing B) Reducing C) Recycling D) None

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

IV B.TECH. I SEM., II MID-TERM EXAMINATION, December-2021

GREEN BUILDING TECHNOLOGY(GR18A3128)

Time: 10 min Date:13/12/2021 Max. Marks: 5

Name: **Roll No.**

I Multiple choice Questions

1. Sustainable construction considers the _____and _____impacts of construction activities on the surrounding neighbourhood. [ ]

   A) Operational; economical B) environmental; operational

   C) Environmental; social D) None of the above

2. Life Cycle Costing (LC C) is a technique to establish the _____ cost of ownership. [ ]

   A) Initial B) partial C) total D)maintenance

3. Indira Paryavaranbhavan located in Delhi is a LEED_____ Rated building. [ ]

   A) Platinum B) Gold C) silver D) bronze

4. _____ ventilation requires less energy, capital and maintenance costs, and contributes less GHG emissions. [ ]

   A) Mechanical B) Natural C) Automatic D) None of above

5. Which of the following is not a green Building [ ]

   A) CII-Green business centre B) Infosys-Pocharam

   C) Suzlon-one Earth Pune D) TCS-Hyderabad

6 .HVAC Systems includes Heating,----------Air conditioning systems [ ]

   A) Volume B)Ventilation C)Vaccum D) Volatile

7. Which of the following is not a energy conservation measure

   A) Building Envelope B)Lighting C)Indoor water management D) Painting

8. ----------wall is a part of passive solar design technique [ ]

   A) Concrete B)Steel C) Trombe D) Bamboo

9. Integrated life cycle design is an important tool for _____ civil engineering [ ]

   A) Structural B)Geotechnical C)Transportation D)Sustainable

10. ECB stands for_____ [ ]

    A) Energy conservation building code B) Energy consuming building code

    C) Energy consuming building code D) Energy consuming boxing code

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
IV B.Tech, I Sem, I MID-Term Examinations, October 2021
GREEN BUILDING TECHNOLOGY (GR18A3128)
Department of Civil Engineering
Mid-1&Mid 2 Marks

S.No	Reg No	Student Name	Mid 1	Mid II
1	16241A0161	Abdul Samad	9	8
2	18241A0161	A Nachiketh	9	5
3	18241A0162	Aleti Jagadish	10	14
4	18241A0163	Amirneni Anusha	11	12
5	18241A0164	Anireddy Avinash	13	12
6	18241A0165	Ashitha Golla	13	14
7	18241A0166	Animesh Baathuk	10	13
8	18241A0167	Boppu Lokesh	8	12
9	18241A0168	Budagam Harshith	10	9
10	18241A0169	Chilumula Sridhar	9	17
11	18241A0170	Dandre Vennela	14	14
12	18241A0171	Doti Upender	11	14
13	18241A0172	Eda Manasa	16	14
14	18241A0173	Gonda Harshini	18	14
15	18241A0174	Gore Kamalakar Sailesh	9	11
16	18241A0175	Gore Kamalakar Sandeep	9	7
17	18241A0176	Guddati Arun	10	11
18	18241A0177	Vijay Narasimha Reddy Kolagtla	7	5
19	18241A0178	Kancharakuntla Deepika	13	11
20	18241A0179	Kota Rashmitha	7	6
21	18241A0180	Kothuri Pranay	9	13
22	18241A0181	Kudala Rama	12	13
23	18241A0182	Kummari Srilekha	14	17
24	18241A0183	Kunchala Adarsh	8	7
25	18241A0184	Kurra Neeraj Prasad	12	8
26	18241A0185	Kyama Pavan	12	5
27	18241A0186	M Shekhar	12	6
28	18241A0187	Malraj Manvitha	18	20
29	18241A0188	Matharasi Sai Kumar	19	13
30	18241A0189	Md Ameer Sohail	11	14
31	18241A0190	Md Amir	15	15

32	18241A0191	Medari Vikram Aditya	8	7
33	18241A0192	Mediga Karthik	14	16
34	18241A0193	Moniesh Reddy Sunkara	10	7
35	18241A0194	Kaushik Nadella	8	9
36	18241A0195	Nikhitha Kasuvojula	15	14
37	18241A0196	Nunavath Suman	8	8
38	18241A0197	P Kishore	5	5
39	18241A0198	Peesu Spandana Reddy	15	13
40	18241A0199	Prathyusha Maddala	16	14
41	18241A01A0	Bavanari Pratyush	11	14
42	18241A01A1	Putta Rohith	8	8
43	18241A01A2	Rahul Pradhan	15	12
44	18241A01A3	Rampelli Pravalika	15	11
45	18241A01A4	Rangu Soniya	14	15
46	18241A01A5	Rentala Adarsh Reddy	12	18
47	18241A01A6	Ritish J	11	6
48	18241A01A7	Seelam Rahul Goud	7	7
49	18241A01A8	Shaik Afeez	12	11
50	18241A01A9	Shaik Shoaib	8	9
51	18241A01B0	Shivarathri Sai Kumar	8	3
52	18241A01B1	Shivarathri Tharun	8	7
53	18241A01B2	Sowmika Boyapati	14	16
54	18241A01B3	Vishruth Reddy T N	16	16
55	18241A01B4	Tekula Prashanth Reddy	9	13
56	18241A01B5	Teegala Someshwar Reddy	13	10
57	18241A01B6	Thatipamula Vigna Sai	10	6
58	18241A01B7	Thota Sri Sai	13	16
59	18241A01B8	Vedati Manikanta Karthik	17	16
60	18241A01B9	Vallapu Reddy Sushrutha	19	14
61	18241A01C0	Yanala Rithish Reddy	15	11
62	19245A0107	Chougoni Shivashankar	9	6
63	19245A0108	Kota Anvesh	8	10
64	19245A0109	Polagani Chandu Goud	12	12
65	19245A0110	Sadgari Karthik	0	10
66	19245A0111	Gugulothu Pavan	17	14
67	19245A0112	A Raghavendra	10	12

S.No	Reg No	Student Name	MID 1	MID 2
1	17241A0153	Sujith Kumar Shinde	9	7
2	17241A0157	Vuppula Mithunkumar Reddy	9	8
3	18241A0101	Ajmeera Ganesh	7	12
4	18241A0102	Anabotula Sravani	18	17
5	18241A0103	Anumatla Manoj	10	10
6	18241A0104	Byna Rishitha	12	16
7	18241A0105	Bura Tharasri	12	11
8	18241A0106	Pudari Badrinath Goud	3	3
9	18241A0107	Balasani Rohith	9	15
10	18241A0108	Bandari Veeraswamy	11	13
11	18241A0109	Bandi Varun Kumar	5	4
12	18241A0110	Bashipaka Pradeep	13	12
13	18241A0111	Bathula Nikhil	7	10
14	18241A0112	Batikiri Veerendra Swamy	15	17
15	18241A0113	Bhukya Soujanya	11	2
16	18241A0114	Bhukya Varun Naik	14	13
17	18241A0115	Boddu Pavan	11	15
18	18241A0116	Byagari Rangaraju	12	11
19	18241A0117	Chada Ruchita	14	14
20	18241A0118	Chinthakuntla Thriveen	8	11
21	18241A0119	Cv Jaswanth Surya	10	6
22	18241A0120	Dosapati Nishu	16	9
23	18241A0121	G Prashanth	9	6
24	18241A0122	Gaddipati Lohitha	13	12
25	18241A0123	Gangam Rohit Reddy	5	6
26	18241A0124	Gottemukkala Govardhan	15	7
27	18241A0125	Hrishikesh Bansal	14	5
28	18241A0126	Janapati Raju	13	11
29	18241A0127	Jyothika Mannava	18	19
30	18241A0128	K Harshitha Reddy	18	18
31	18241A0129	Kolan Reshikesh Reddy	9	6
32	18241A0130	Karri Bharath Chandra Reddy	13	12
33	18241A0131	Kuppala Nihar	12	13
34	18241A0132	Kurva Lavanya	15	16
35	18241A0133	Maddimsetty Sri Charan	8	10
36	18241A0134	Maganoor Manaswini	17	20

37	18241A0135	Maloth Bhavsingh	5	9
38	18241A0136	Malothu Naveena	18	20
39	18241A0137	Manda Ithihas	11	10
40	18241A0138	Mohammad Ashfaq Ahmed	12	16
41	18241A0139	Mohammed Omer Shareef	13	16
42	18241A0140	Mukundu Naveen	AB	AB
43	18241A0141	Nalumasu Sahithi	11	13
44	18241A0142	Nampelly Ravi Kumar	11	12
45	18241A0143	Narra Shashidhar Reddy	13	14
46	18241A0144	Patlola Vinay Reddy	7	5
47	18241A0145	Pattambetty Pavankumar	10	6
48	18241A0146	Pola Tharun	11	6
49	18241A0147	Posani S V A Kalyan	13	9
50	18241A0148	Pulle Manichadra	7	10
51	18241A0149	Rajulapati Rohit Naga Sai	16	13
52	18241A0150	Sura Subbaram Reddy	9	5
53	18241A0153	Sunkari Vikas	17	12
54	18241A0154	Thirupathi Rao Salla	16	14
55	18241A0155	Trivikram Reddy	7	5
56	18241A0156	Thrupti Shreya	9	8
57	18241A0157	Vakamalla Bhavya Sree	14	14
58	18241A0158	Vemula Manisha	13	13
59	18241A0159	Vuppula Keerthana	14	11
60	18241A0160	Yalla Anitha	17	17
61	19245A0101	Kancherla Bharath	14	16
62	19245A0102	Elupula Kumaraswamy	14	13
63	19245A0103	Brahmadevara Bhavitha	17	18
64	19245A0104	Dasari Namratha	14	13
65	19245A0105	T Chandana	17	16
66	19245A0106	Kola Haritha	12	19

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I | II **MID TERM EXAMINATION**

No. 395500 H.T. No. 1 8 2 4 1 A 0 1 5 5

Name of the Examination IV th B-tech, 1st sem, II nd mid examination

Course Green building Technology Branch Civil Date 12/12/21

Signature of the Invigilator

Q.NO.	1		2		3		4		5		6		TOTAL
	a	b	a	b	a	b	a	b	a	b	a	b	
MARKS	2		1½				½						3

START WRITING FROM HERE

1) Passive Solar System can be defined where whil-
onstruction of building there should be wind
loor, Door, etc like this all should be there
ind there should some space on north
nd south side. when sunlight comes from
e window then that sunlight is absorbe
y the floor and when it ~~Emit~~ Emitted ou
t night time that is process called Pas
olar system. where as in summer we ha
o keep the shades because night time also
the wheather will be hot then no need to

to Emit.

There are two types of Passive solar system.

-> Direct solar system

-> Indirect solar system

-> Direct solar system

when sunlight comes directly to floor w that heat it will absorb and it will Emmite at Night then that process is called Direct Solar System.

-> Indirect Solar System

Indirect solar can be defined as where when sunlight falls on a wall not on a floor. then the heat should that wall means it takes too long time so, that will Emite slowly out that is called Indirect solar System.

4.) The Engineer will evaluate the building materials they are using good quality of materials are not, they are costly are less price they will check and how they are utilising the materials they will see in building. They will check the materials are coming on time or not. They will check less cost and more quality a they will check the final material they maintaining good standards are not. li they will check each and every mate this is good or not, how they are using it they will check it and they evaluate the building materials

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(Autonomous College Affiliated to JNTUH) (12 Pages)
Bachupally, Kukatpally, Hyderabad - 500090

I | II **MID TERM EXAMINATION**

Manaswi

No. 394628

H.T. No. | 1 | 8 | 2 | 4 | 1 | A | 0 | 1 | 3 | 4 |

Name of the Examination IV B.tech I Sem Mid II Examinations

Course Green Building Technology Branch Civil Engineering Date 13/12/2021

Signature of the Invigilator

Q.NO.	1		2		3		4		5		6		TOTAL
	a	b	a	b	a	b	a	b	a	b	a	b	
MARKS	5		5		5		5						15

START WRITING FROM HERE

Answer the following questions:-

Ans Passive solar system design for buildings:-

Passive solar design is a wide term which includes the design of a building mainly to ensure the proper lighting, air ventilation and energy consumption.

It uses the natural daily lighing, increases the air ventilation and air passage and ultimately conserves the energy consumption.

The components which have to be designed properly for passive solar design are

1) ~~Wall~~ Building envelopes (walls, roofs, windows)
2) Solar heaters.

C

2An ~~Ecofri~~

Environment friendly and cost effective building technologies:-

⇒ Due to the increase in urbanization and globalization there is an extreme boom in the construction industry.

⇒ Due to the use of more and more conventional building materials, the natural resources are decreasing day by day and its is in an alarming rate.

⇒ Usage of ecofriendly materials and contributing for the sustainable development is the priority now

⇒ There are many technique which are ecofriendly but also cost-effective. These building techniques reduces the overall construction cost of the building and helps in saving the environment to some extent.

⇒ Some of the environment friendly and cost effective building technologies are

(1) Rat trap bond in wall construction :-

⇒ The arrangement of bricks in a wall is called a bond. There are different kinds of wall bonds like English bond, flemish bond, Stretcher bond, header bond and Rat trap bond.

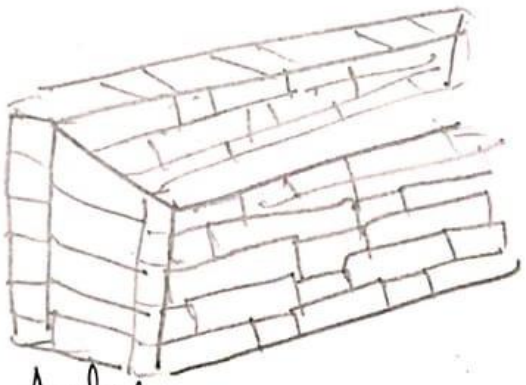
⇒ In the rat trap bond the bricks are laid by their sides having a 4" cavity with an alternative stretcher and header bond

⇒ Rat trap bond required 20% less bricks than the normall walls.

⇒ These walls also provide good thermal insulation.

⇒ These walls reduce the overall cost of construction and also contributes in the energy conservation.

⇒ These walls has more strength and are suitable for a 2-storey building.



(2) Brick Arches

⇒ Providing the brick arches for the smaller spans cuts down the cost of construction compared to the normall arches and also it gives the aesthetic appearance.

⇒ In the brick arches, brick pieces are placed at the bottom of the arch

8Ans principles of sustainable development in building design:-

⇒ Sustainable development is the reducing the impact on the natural environment, by using the natural resources in a required way without compromising the needs of the future.

⇒ Sustainable development in a building design helps to conserve the natural material and energy.

⇒ LEED is a rating system which gives the rating to the green building to their sustainability.

The principals for sustainable development in the building design are:-

1) Selection and development of site wisely

⇒ Selecting the proper site is brucial for sustainable development.

⇒ Selecting a site in the rural areas reduces the use of land for agricultural, wetland etc.

⇒ Selecting a site in urban areas and constructing as the habitat is already in use.

4 Ans Engineering evaluation of building materials:

⇒ Building materials production requires a lot of natural resources and extensive use of these materials is depleting the availability of natural resources at an alarming state.

⇒ Engineering evaluation, the rating is given to the building materials to 100 based upon different considerations.

⇒ After looking into a scale, proper decision is based to use that building material in construction for the sustainable development.

⇒ The following are considered for the engineering evaluation of building materials.

~~① low embodied builds~~

① locally available building materials

② Embodied building materials.

③ percentage of reusablity.

④ Use of renewable resources

⑤ Conservation of energy.

⑥ Recycability.

⑦ Durability.

⑧ Environmental impact.

De

4) Use of renewable resources.

⇒ renewable resources like solar, wind, thermal, tidal etc. should be used in the production or operation of the building material.

5) Conservation of energy.

⇒ The Energy conservation building code provides certain rules in the production operation of the material.

⇒ Rating is given, if the material is produced according of ECBC. It is given a rating of '5' otherwise '0'.

6) Recyclability.

⇒ recycling the material helps in the sustainability and reduce the cost.

⇒ rating is given according to the recyclability.

7) Durability

⇒ Durability is the life of the material, how long the material lasts.

⇒ rating is given from the table based on its durability.

8) Environmental impact.

⇒ The materials should provide less overall impact on the environment.

⇒ rating is given to the materials based upon its environmental impact.

Conclusion:-

All the rating are summed up to a scale of 100. Based upon the table showing the relevant information, engineering evaluation is done.

Gokaraju Rangaraju Institute of Engineering & Technology

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I	II	MID TERM EXAMINATION

No. 374800

H.T. No.	1	8	2	4	1	A	0	1	7	1

Name of the Examination IV.B.Tech - I-semister-Mid-I

Course B.Tech Branch Civil-B Date 20/10/2021

Signature of the Invigilator

Q.NO.	1		2		3		4		5		6		TOTAL
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2) Renewable sources of energy :-

* The energy sources that can be replenish over and over ag is known as Renewable sources.
* These renewable sources are never ~~de~~ depleted.
* Some of the sources on the earth are hydropower, wind ene Solar energy, Tidel energy and geo thermal energy.
* The sources from the ground are nuclear fussion and biofue from plants.
* The Renewable energy sources are usually converts into el

(or) Thermal (heat) energy.

Non-renewable sources of energy :-

* The energy sources that we use and can not produce in short Period of time is known as Non-renewable sources.

* Therefore we can say that the energy sources that we cannot reuse.

* Some of the non-renewable sources are fossen fuels like Pettolium, disel etc., and Tar sands. and nuclear fission.

* The non-renewable energy sources are usually converts into electricity and Mechanical energy.

* The most of the sources we use (or) we obtain is non-renewable sources.

1) * Green building rating system is a measuring tool, that measures the environmental performance of a building throughout its life cycle.

* Usually it comprise of set of criteria covering the parameters of design, construction and operation of green building.

Types of Green buildings rating systems in India:-

i) The Greenbuilding Council & LEED
ii) BREEAM
iii) CASBEE
iv) GB-Tool
v) HK-BEAM
vi) GRIHA

* These various types of greenbuilding rating systems in India ha been pre-assigned certain points for ~~eer~~ each criterin.

* Various rating systems were assigned various nuber of points f each criteria. And sets performance benchmark and goa

*For a project has given points after it fulfils the ra of various rating systems.

* The points were added a final rating is given for a by various rating systems.

* The carbon foot print may have the impact on enviro.
Therefor the reduction of carbon footprint is required to
minimise the impact on the environment.

* Now a days, a large number of industries and factories have
been constructed for a development of country. These indust
-es and factories howes been releasing the chemicals
such as CO_2, Nitrogen etc.... Therefor the aim of c
carbon footprint is reduce the carbon chemicals that
are emiting from the industries and factories.

Green Building Technology
Assignment - 1

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1. Explain about the type of rating from IGBC and features of the following Hyderabad metro stations?

Miyapur and Ameerpet.

Indian Green Building Council (IGBC) has introduced IGBC Green Mass Rapid Transit System (MRTS) rating to encourage eco-friendly 'green' aesthetics, construction and operation. The rating system assists to address national priorities like conserving natural resources, save energy and water, renewable energy and waste management that will benefit passenger health and comfort.

IGBC platinum certification was awarded to 17 elevated stations of Hyderabad Metro Rail project - Stage I & II.

1) Nagole
2) Uppal
3) Survey of India
4) NGRI
5) Habsiguda
6) Tarnaka
7) Mettuguda
8) Miyapur
9) JNTU college
10) KPHB Colony
11) Kukatpally
12) Balanagar
13) Moosapet
14) Bharat Nagar

15) Erragadda
16) ESI Hospital
17) S.R. Nagar

-Above mentioned Hyderabad Metro Rail stations have scored =75 points each as per the selection criteria. These ratings are based on six environmental categories as defined by IGBC Green Mass Rapid Transit System (MRTS) which include -

1) site selection and planning
2) water efficiency
3) Energy efficiency
4) Material Conservation
5) Indoor Environment and comfort
6) Innovation in Design and construction.

The prestigious award was presented by Mr C N Raghavendran, chairman, IGBC - Chennai chapter in presence of Mr A.K. Tewari, Adviser (EnHM), Railway Board, Ministry of Railways and Mr V Suresh, chairman, policy and Advocacy committee, IGBC

Mr. Shrvanand Nimbargi, MD & CEO, L&T Metro Rail (Hyderabad) Limited,

Connecting 16 kilometers of Hyd with 17 stations - Hyderabad metro Rail is the largest project under private-public partnership.

1) Ameerpet Metro station

-Ameerpet Metro Station : Your one stop solution for Everything !

1) Ameerpet Metro station is one of the busiest Metro stations and is also located in the heart of -Hyderabad. It is built keeping in mind the interest and conveniences of commuters.

2) passangers are provided with -facilities such as escalators and -elevators to reach the station comfortably.
The station is also equipped with announcement boards, electronic display systems, etc to keep the passangers updated at all times.

3) The station also has service roads underneath to provide last mile connectivity by allowing other public transportation systems to be parked for dropping / picking passengers right in front of the station, without interrupting traffic.

4) -Ameerpet Metro station has retail shops, a medical store, eateries and a lot more that will cater to all kinds of needs of the travelers.

-Here is a blueprint of the retail therapy available at Ameerpet Metro station.

1) Grab a roll on the go!

With eateries like subway available at Ameerpet Metro station, it's easy to pack your food or have a quick bite while on your way to work or back home.

The very-famous 'Dadus Mithai' is available at Ameerpet Metro station. The place is beautifully decorated and offers a wide variety of Mouth-watering sweets, appetizers, main course etc.

AMEERPET INTERCHANGE STATION - AN ENGINEERING MARVEL

The Ameerpet station is built in a unique way for effortless interchange of commuters across both corridors (Corridor 1 - Miyapur to LB Nagar at higher level, Corridor 3 - Nagole to Shilparamam at lower level).

All the facilities at the station are seamlessly integrated in a passenger-friendly manner and passengers can transit from one corridor to another in a smooth way.

Highlights of the Ameerpet Interchange Metro station:

1) Conceptualised, designed and executed by in-house team of L&T.
2) The station measures 142 m long and 40m wide. This will have retail outlets, entertainment zones and convenience outlets.
3) Concourse unpaid level will be used by pedestrians to cross over from one zone to another allowing uninterrupted traffic movement.
4) Entry into this level will not require a ticket. Convenience stores, ATM machines, offices for the technical staff and other amenities are provided on this level.
5) platform level of corridor 1 will be at 30 m height and roof level at 36m.
6) the roof is designed with tetrahedron supported steel columns which are placed on the edge, for unobstructed view and improved aesthetics.
7) station is provisioned with entry and exits from all four sides for commuters to enter the station.
8) Intermediate floors between the slabs have been created to accommodate technical services.

Inclusive and Sustainable Mobility: Hyd Metro example

Miyapur and other stations

1) Dev't of sidewalk on both sides of 4.5m to 15m (15ft to 50ft) wide with eco-friendly paver blocks (Zoom length) & access control railing in Miyapur-Hydernagar stretch.
2) 2 lane service road of 7m (23ft) on either side with paver blocks / BT
3) Bicycle tracks
4) Bus bays, auto bays, bays of EVs etc., of adequate space.
5) 1.5m wide Green belt along the service road.
6) park & Ride facilities for pvt vehicles
7) IPT bays, Bicycle stns etc
8) Street furniture & beautification.

1) What are the alternative construction methods available for green buildings?

-Advanced green building technologies

1) Haiku Designer Series LED fixture

1) The Haiku Designer series LED fixture is designed to be an efficient, sleek and convenient for the consumer.
2) It is so smart, that once it's set up, it doesn't even require the consumer to have a mobile app to guide its use.
3) It's composed of 144 energy-efficient LEDs, has a bank of sensors including motion, infrared, ambient light and temperature, and it's offered in several different colour options.
4) The newly trademarked Active Light Equalization technology adjusts the LEDs' brightness automatically as the ambient light levels change to 16 different dimming settings.
5) "when the sunlight pours in, our light will automatically dim down. Or you can schedule it to dim setting 5 and 2200 K, which will help the body release Melatonin for a good night sleep". "Users can create customized lighting for any occasion - from amber to bright white."

2) BASF - HP Wall systems

1) These innovative, structural insulated wall assemblies achieve up to R-34 in 2x4 construction, provide lateral bracing without OSB, save lumber while improving structural and energy performance, and help to simplify the construction process.

2) "The great thing about this system is that you can achieve 2x6 performance in a 2x4 construct," said Chris Rosemond, a construction scientarchitect with BASF.

3) "These systems provide lighterweight, durable, long-lasting assemblies in a single-integrated system, which allow you to build stronger homes with less materials".

4) They also help improve moisture management, mitigating moisture-related losses, reduce condensation risk, and improve heating and cooling loads and associated utility usage.

3) Panasonic - select cycler whole House ventilation system.

1) Select cycler is a cost effective, whole Ventilation solution for ASHRAE 62.2 compliance.

2) By combining the best points of both central fan integrated ventilation and exhaust fan ventilation, Select cycler provides a high quality, energy-efficient ventilation solution.

5) Alpha protech Engineered products, Inc. - ~~TECHNOply~~
- TECHNOply Synthetic Roof Underlayment.

1) TECHNOply Synthetic Roof Underlayment, a vertically integrated, polymer-based roofing material to replace traditional asphaltic papers.

2) It is manufactured and constructed from numerous types of polymers that are all polypropylene based," "engaged in a full recycling program that allows us to incorporate scrap materials back into the manufacturing process without any detriment to the final product".

3) As a result, TECHNOply brings no harmful VOCs or contaminates on the job site, unlike asphalt-based products and answers the question of sustainability, he said.