Green Building and Design Certificate Overview

Description:

This program aims to provide an overall understanding of the Green Building and Design through a number of courses approaching green building design in a holistic way. This program also presents LEED® specific design related concepts which are beneficial to both the contractor and design professional. The goal of the training is to understand and enforce the core concepts and design principles behind sustainable buildings, integrate green practices and strategies into construction processes and, become knowledgeable enough about the LEED® rating system, as it applies all aspects of design include conceptual design, site, landscape, water, indoor air quality, materials, transport and energy.

This unit will prepare you to apply for the following certification(s):

LEED Green Associate -Green Building and Design Training would meet the eligibility requirements of the Green Building Certification Institute (GBCI) to qualify for taking the LEED Green Associate Exam. A LEED GA has knowledge on the fundamentals of green practices.

The eligibility requirements of this course are:

Intended for people for all kinds of backgrounds including students with no prior knowledge or training in this field. This program introduces all basic courses as well as advanced courses focused on energy simulation, indoor air quality and code compliance.

Curriculum

The three-semester certificate program would comprise of 20 credits of core courses along with 14 credits for supplementary elective courses focused on professional certification. The core curriculum would deal with the basic fundamentals of the courses and the electives would be focused towards professional certification as well as specialty courses. The completion of the core curriculum would be mandatory for participation in the supplementary courses.

Along with this, the core curriculum would comprise of workshops over the weekend, a practicum project and final presentation.

The core curriculum would address aspects of green building design strategies, including energy and water efficiency strategies, waste management as well as code compliance. Through lectures, seminars, field trips, workshops, applied projects and design charrettes, various perspectives of architects, designers, and engineers would be addressed for sustainable building design.

LEED Green Associate		
MODULE	**TOPIC**	**CREDIT HOURS**
CORE COURSES:		
1	Building Science	**3**
2	Sustainable Sites and Green Landscape	**2**
3	Water Efficiency and Waste Management	**2**
4	Materials and Resources	**2**
5	Seminar: Market Trends	**2**
ADVANCED COURSES	Subtotal	**11**
6	Codes and Certification	**2**
7	Indoor Environmental Quality	**3**
8	Energy and Atmosphere	**3**
9	Professional Conduct	**1**
ELECTIVE COURSES	Subtotal	**9**
10	Internship	**6**
11	Thermodynamics and HVAC Systems	**2**
12	Building Energy Simulation	**3**
13	Renewable Energy	**3**
	Total Required Credits	**20**
	Total Elective Credits	**14**

Note:

"Credit Hours" refers to this class being conducted at a college or community college. Each credit hour represents 16 in-class hours or one hour of class time each week for 16 weeks.

Credits:

- Material developed by Greenstreet
- Modified and updated by Samuel Breedlove, Heidi Vasiloff P.C.

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Module 1: Building Science

Description:

This course would introduce the fundamentals of buildings science, various aspects of energy efficiency

comprehensive overview of the different systems and technologies and introduce the cutting edge innovations in building practices.

Certification(s): LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 3

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the fundamentals of building science.
2. Be well aware of different active and passive system types.
3. Identify appropriate energy efficient design strategies as a response to different climatic conditions.
4. Enlist various construction materials (innovative materials such as straw bale, SIP) and their application.
5. Discuss effectiveness of traditional construction technologies versus new construction technologies.
6. Effectively use the psychrometric chart for thermal comfort calculations.
7. Discuss various ventilation strategies.
8. Perform basic daylighting calculations and simulations.
9. Identify energy efficient design strategies in buildings and critique the same.

Module1: Building Science		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Basics of Building Science	
2	Active and Passive Systems - Direct Heat Gain - Indirect Heat Gain - Trombe Wall - Site Orientation - Shading - Innovative HVAC Systems: • Ground Source Heat Pump • Absorption Cooling	
3	Climate Responsive Design	
4	Materials: Building Materials, Innovative Materials (strawbale, adobe etc.)	
5	Construction Technology: Old techniques as well as cutting edge technologies	
6	Thermal Comfort: Introduction to Psychrometric Chart	Use of Climate Consultant Software
7	Ventilation Strategies - Natural as well as Mechanical	
8	Daylighting	Use AGi32 software for basic daylighting simulation.
9	Case Studies	Group project: To study an existing building and identify its energy efficient design strategies, along with energy efficiency measures recommendations.

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

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Module 10: Internship

would give the student an opportunity to experience the LEED certification process.

Certification(s): LEED Green Associate
Prerequisite: None
Required Materials: None
Credit Hours: 6

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the LEED certification process.
2. Apply the knowledge of LEED certification process to projects.
3. Discuss pre-requisites and credits for Sustainable Sites and its applicability during the certification process.
4. Discuss pre-requisites and credits for Water Efficiency and Waste Management and its applicability during the certification process.
5. Discuss pre-requisites and credits for Energy and Atmosphere and its applicability during the certification process.
6. Discuss pre-requisites and credits for Materials and Resources and its applicability during the certification process.
7. Discuss pre-requisites and credits for Indoor Environmental Quality and its applicability during the certification process.
8. Discuss pre-requisites and credits for Innovation in Design and its applicability during the certification process.
9. Discuss credits for Regional priority and its applicability during the certification process.

Module 10: Internship Outline		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	LEED Certification Process	
2	Application of the Certification Process	
3	Sustainable Sites	
4	Water Efficiency	
5	Energy and Atmosphere	
6	Materials and Resources	
7	Indoor Environment Quality	
8	Innovation in Design	
9	Regional Priority	

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Module 11: Thermodynamics and HVAC Systems

Description:

The course on thermodynamics enables the student to perform simple heat gain and heat loss calculations, understand different HVAC systems and their performance under different climatic conditions.

Certification(s): LEED Green Associate

Prerequisite: Building Science Module

Required Materials: *Residential Energy: Cost Savings and Comfort*, by John Krigger and Chris Dorsi

Credit Hours: 2

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Define terms such as temperature, pressure, energy and power.
2. Perform simple heat transfer calculations.
3. Calculate air pressure, flow and infiltration.
4. Differentiate between power and energy as well as carry out simple calculations to determine the same.
5. Discuss various electric systems such as meters, equipments, lighting etc. and calculations involving the same.
6. Calculate EER and COP for heating and cooling systems
7. Discuss various heating and cooling systems, constant volume as well as variable air volume.
8. Discuss applicability of different system types, i.e. central packaged system versus a number of split systems, heat pumps and their advantages.
9. Perform simple calculations for various systems including unconventional systems such as ground source heat pumps etc.
10. Calculate air flow and fan power.
11. Define pressure drops and calculate the same.

Module 11: Thermodynamics and HVAC Systems		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Temperature and Heat	
2	Heat Loss and Gain	
3	Air Pressure and Flow	
4	Electric Power and Energy	
5	Electric Systems	
6	Define SEER, EER, COP for HVAC systems.	
7	HVAC Systems: Constant Volume and Variable Volume Systems	
8	Packaged and Split Systems	
9	Innovative HVAC systems: Ground Source Heat Pumps, Evaporative Cooling	
10	Calculating Fan Power and CFM	
11	Calculating Duct Pressure Drop	

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Module 12: Building Energy Simulation

Description:

evaluate home performance through energy analysis software such as REMrate and REMdesign, which would be taught in this course. Effectively simulating the building, calibrating it against utility bills, and performing simulations to define the most appropriate energy conservation measures would be taught.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 3

Expected Outcomes:

1. Upon successful completion of this course a student would be able to:
2. Adeptly use softwares for basic simulations.
3. Accurately model the building envelope and construction assemblies.
4. Accurately simulate envelope loads, internal loads (lighting, equipment and occupants) and infiltration to define building loads.
5. Simulate basic HVAC systems with accurate SEER and COP values.
6. Determine energy efficiency measures.
7. Calculate costs and pay back periods for various energy efficiency measures.

Module12: Building Energy Simulation Outline		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	REScheck for code compliance analysis and REMrate and REMdesign for Energy Analysis	
2	Simulation of Building Envelope	
3	Simulation of Internal Loads	
4	Simulation of HVAC Systems	
5	Energy Conservation Measures	
6	Simple Payback	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

Credits:

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Additional Resources: RESCheck demonstration to show code compliance. REMrate for energy analysis, determine energy efficiency measures as well as HERs Index score.

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Module 13: Renewable Energy

Description:

This course introduces the fundamentals of buildings

integrated design. It provides a comprehensive overview of the different systems and technologies and introduce the cutting edge innovations in building practices.

Certification(s): LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 3

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Identify key issues related to solar energy as well as all different solar energy technologies.
2. Identify key issues related to wind energy, feasibility requirements as well as the present turbine technology.
3. Identify key issues related to biomass and the conversion factors.
4. Identify key issues related to ethanol and its extraction.
5. Identify key issues related to the geothermal energy, its limitations as well as the present geothermal industry.
6. Identify key issues related to fuel cell technology, various kinds of fuel cells as well as the existing fuel cell industry.
7. Compare various technologies for feasibility and application for varying climatic conditions, locations and zones.

Module 13: Renewable Energy		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Solar - Environmental Issues - Thermal Technology • Passive Systems • Collector Technology - Photovoltaic • Solar Cells • Active Systems • Building Integrated Photovoltaics - Solar Industry	
2	Wind - Environmental Issues - Electricity Generation - Water Issues - Turbine Technology - Energy Conversion - Wind Industry	
3	Biomass - Environmental Issues - Biological Forms - Forest Residue - Plant Matter - Biodegradable Waste - Industrial Efforts - Thermal Conversion - Chemical Conversion - Biomass Industry	
4	Ethanol - Environmental Issues - Vehicle Fuel - Bioethanol - Consumer Production Systems - Ethanol Industry	

5	Geothermal - Environmental Issues - Electricity generation - Limitations - Exploration Issues - Geothermal Industry	
6	Fuel Cells - Environmental Issues - Power generation and Conversion - Proton Exchange Fuel Cells - High Temperature Fuel Cells - Fuel Cell Industry	
7	Comparison of Various Technologies	

This course aligns with National Recognized Certifications in Green Building and Design.

For testing information go to: The U.S. Green Building Council's LEED website at www.usgbc.org.

Credits:

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Module 2: Sustainable Sites and Green Landscape

This course would introduce the fundamentals for LEED® certification process, basics related to main concepts and environmental practices for building

Sites and Green Landscape analysis and discussion.

Certification(s): LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 2

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the fundamental concepts and history of LEED®.
2. Identify appropriately the different LEED® rating systems and certification levels.
3. Be able to identify the environmental categories and applicable credits for sustainable sites.
4. Understand the importance of selecting and developing a site for building construction and identify the some of the urban impacts that this might have (e.g. protection of natural habitats, density, transportation, pollution, etc).
5. Discuss the concepts of site's stormwater management systems and best management practices (BMP).
6. Enlist various strategies that help to reduce the heat island effect (based on materials for roof and non-roof area as well as vegetation use).
7. Identify the different zone categories for site illumination and have the basic understanding of ANSI/ASHRAE/IESNA Standards goals.
8. Discuss about measurements for pollution control during site construction.
9. Identify the best practices to support high-performance building operations.

Module 2: Sustainable Sites and Green Landscape		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	LEED® basics: background, certification types, categories, prerequisites and credits.	
2	Sustainable Sites (Block 1): - Environmental assessment, site selection and brownfield redevelopment.	
3	Sustainable Sites (Block 2): - Development density and community connectivity, and alternative transportation.	
4	Sustainable Sites (Block 3): - Site development and storm water design	
5	Sustainable Sites (Block 4): - Heat island effect and light pollution reduction	
6	Sustainable Sites (Block 5): - Construction Activity Pollution Prevention, Building Exterior and Hardscape Management Plan and Integrated Pest Management, Erosion Control and Landscape Management Plan - Introduction to native landscape and xeriscape principles	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at www.usgbc.org.

Credits:

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Activities: Group project: Research and analyze different case studies, and identify concepts discussed in class.

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Module 3: Water Efficiency and Waste Management

Description:

This course emphasizes on the fundamentals for Water

as well as sites. Topics and credits for LEED® certification process are analyzed and discussed.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the fundamental concepts for potable water supply and waste water systems.
2. Understand water consumption patterns in buildings.
3. Identify opportunities for water saving and water re-use in building site.
4. Enlist various strategies to reduce and/or eliminate the need of potable water for landscape irrigation on project site.
5. Identify minimum efficiency requirements of fixtures and fittings under the current Uniform Plumbing Code and International Plumbing Code.
6. Perform basic calculations for water use of fixtures and fittings in buildings.
7. Identify energy efficient control technologies and equipment to reduce water consumption.
8. Identify the different irrigation technologies and best applications.
9. Discuss the practice of re-use of storm water and gray water in buildings and landscape.
10. Identify on-site waste water treatments.

Module 3: Water Efficiency and Waste Management		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Principles of water use and drainage in buildings and its importance.	
2	Hydrologic cycle in nature (precipitation, runoff, evaporation and percolation).	
3, 4	Potable water use reduction in building - Usage of water by building type - Water conserving types of fixtures, fittings and appliances in buildings - Water use calculations - Water re-use in fixtures	
3, 4, 8	Water efficient landscape systems - Importance of native plant species in arid climates - Efficient irrigation systems - Water re-use in irrigation: stormwater, gray water and treated water	
9	Wastewater technologies - Reduction of waste water as a result of use of low water consumption fixtures, fittings and appliances and water re-use. - On-site waste water treatment systems (small buildings septic tank, disposal bed, leaching fields, sand filters, greenhouse ecosystems, etc.)	
7	Rainwater collection and storage (catchment areas and storage capacity calculations)	
10	Bioswales and pervious pavement systems.	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

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Activities: Building water use calculations for mid size building.

Required Readings: Introduction to LEED® (Brief of document)

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Module 4: Materials and Resources

Description:

Materials and Resources course aims to provide an understanding of impacts of construction in the

reduction of natural resources use, and recycle and reuse of materials employed in buildings edification

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 2

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the fundamental concepts of 3R: reduce, recycle and re-use of materials and resources in buildings.
2. Enlist structural and non-structural building elements that can be re-used or recycled.
3. Identify differences between recycled content materials and recycled materials.
4. Effective use of waste management concepts and understanding of policies for waste reduction.

Module 4: Materials and Resources		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	3R Principles: Reduce, Recycle Re-use and how these concepts are implemented under LEED® certification for new construction and existing buildings.	
2	Procedures to recycle materials during construction.	
3	Impact of building re-use in the environment.	
4	Construction waste management: recycle and reuse.	

Expected Outcome	Topic	Suggested Activities or Resources
1	Reuse of materials (off-site) in buildings.	
1	Use of materials with recycled content.	
1	Regional Materials	
4	Renewable Materials	
3	Use of certified wood in construction materials and products. • Forest Stewardship Council (FSC) certification	
3	Environmentally Preferable Purchasing (EPP) Policies for: Electric equipment, furniture, lighting, supplies, food and beverages.	
4	Management Policies for reduction of waste generated by building occupants based on: Waste stream audits, waste reductions and recycling programs, use of durable goods, diverting of construction and demolition debris.	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

Activities: Project calculation sample for Materials and Resources

Credits:

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Required Readings: Introduction to LEED® (Brief of document)

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Module 5: Seminar: Market Trends and Policy

Description:

the study and analysis of the tendencies on the Green Building and Design markets included but not limited to materials, technology, manufacturing processes and building design. Guest lectures will provide discussion engagement to related topics and facilitate student contact with local professionals in the area of study.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 2

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss the objectives and goals of green building and design fundamentals.
2. Explain global warming, the role played by CO_2 and the effect of burning fossil fuels.
3. Discuss and understand the basic of cap and trade environmental policy tool.
4. Discuss the latest trends on renewable energy in buildings.
5. Enlist government incentives for the use of energy efficient systems and renewable energy systems in buildings.
6. Discuss the use of technology in building materials production and customization.
7. Explain the goal and importance of Life Cycle Assessment procedure in buildings, products and materials.
8. Discuss the importance of the role of building occupants behavior in designed high-performance buildings.
9. Identify technology and tools that aid the understanding of real-time use of energy use in buildings.

Module 5: Seminar: Market Trends and Policy		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Green Building Certification Institute and U.S. Green Building Council reference resources.	Comparison with other building certifications: Green Globes, BREEAM, etc.
2	Energy and Society- Limits of Fossil Fuels • World energy use and resources, energy use in the US, energy use by source and sector, energy use vs. GDP, greenhouse effect and global warming, mitigating global warming.	
3	Energy policy • Carbon Tax • Cap and Trade • Kyoto Protocol • Carbon Tax vs. Cap and Trade	
4	Renewable Energy Technology in Buildings	- Building Integrated Photovoltaics (Case Studies) - Solar Thermal-Absorption Cooling
5	Federal and State Incentives and Rebates for Energy Efficiency and Renewable 1. Renewable Energy Generation • Corporate Tax Credit for renewable energy generation • State tax credit • Utility rebate programs 2. Energy Efficiency • State Incentives for energy efficiency • Utility rebate programs for energy efficiency 3. Public Private Partnership in Renewable Energy 4. Feed-in Tariffs Vs Renewable Energy Credits (RECs)	
6	Building Materials and Technology -Phase-change materials -Applied nanotechnology in material	

7	Use of technology for material fabrication and massive customization.	
8	Life Cycle Assessment (LCA) - Value of LCA in buildings, characteristics, applications, implications, limitations and link to certification systems.	
9	Behavioral strategies in energy/climate policy design, legislation, regulation, implementation and enforcement.	
10	Interactive tools for energy-use display.	• Dashboards and screens • Web based applications and resources

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

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Module 6: Codes and Certificates

Description:

codes and certifications such as ASHRAE 90.1, IGCC and IECC would be provided. Building certification process (NAHB and LEED) would be briefly explained,

have three prime areas of focus:

1. Building codes
2. Building Certification
3. Federal and State Policy towards weatherization and energy efficiency.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: ASHRAE Standard 90.1 2007, IECC 2009; ASHRAE Standard 55

Credit Hours: 2

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Discuss various buildings codes.
2. Discuss the various building certifications and applicability of the same.
3. Define the various compliance paths for building certifications.
4. Explain code compliance requirements for building certification.
5. Discuss federal and state incentives and utility rebate programs for energy efficiency.

Module 6: Codes and Certificates		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Building Codes and Standards (ASHRAE 90.1 and IECC)	
2	Building Certification (LEED, NAHB and ENERGY STAR)	
3	Prescriptive and Performance Compliance paths	
4	Code Compliance for Certification	
5	Federal and State Incentives and Utility Rebate Programs.	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at www.usgbc.org.

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Module 7: Indoor Environmental Quality

Certification(s): LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 3

Description: This course would introduce the fundamentals of buildings science, various aspects of energy efficiency and integrated design. It would provide a comprehensive overview of the different systems and technologies and introduce the cutting edge innovations in building practices.

Module 7: Indoor Environmental Quality Outline		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Overview of IAQ	
2	Occupant Symptoms associated with poor IAQ	
3	Building factors affecting IAQ	
4	Types of Pollutants	
5	Contaminant Sources	

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Define indoor air quality and its importance.
2. Identify various occupant health symptoms symbolic of poor IAQ, such as acute effects, chronic effects, discomfort, and performance effects.
3. Identify various building factors affecting indoor air pollution.
4. Identify the various pollutants present inside homes.
5. Define source of indoor air pollutants (indoor and outdoor sources).
6. Define strategies to manage sources of pollutants to reduce the cause of the same.
7. Discuss various ventilation strategies and define the most appropriate strategy in accordance to pollutant type and source.
8. Identify presence of mold in homes.
9. Define cause of mold presence.
10. Define strategies to reduce mold growth such as thermostat set points, thermal bridges, windows etc.
11. Carry out basic calculations based on ASHRAE 62.1 Ventilation Rate Method for minimum indoor air quality requirements.
12. Define strategies for Environmental Tobacco Smoke Control.
13. Identify requirements for minimum acoustical performance.
14. Create a construction IAQ management plan.
15. Enlist various low VOC content materials.
16. Identify strategies for indoor air pollution control.
17. Identify requirements for thermal comfort in terms of ventilation requirements as well as building design.
18. Identify requirements for greater comfort in terms of indoor lighting and control.

6	Managing major sources of pollutants in buildings.	

7	Ventilation (Exhaust ventilation, dilution ventilation, ventilation measurements)	
8	Mold	
9	Causes of Mold (Relative humidity, condensation and vapor pressure)	
10	Identifying and correcting common mold and moisture problems.	
11	Minimum IAQ Performance • ASHRAE 62.1 • Ventilation Rate Method	
12	Environmental Tobacco Smoke (ETS) Control	
13	Minimum Acoustical Performance	
14	Outside Air Delivery Monitoring	
15	Construction IAQ Management Plan • During Construction and Before Occupancy	
16	Low Emitting Materials • Adhesives and Sealants • Paints and Coating • Flooring Systems • Composite Woods and Agrifiber Products • Furniture and Furnishings • Ceiling and Wall Systems	
17	Indoor Chemical and Pollutant Source Control	
18	Thermal Comfort • Design • Controllability of Systems	
19	Controllability of Systems- Lighting	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

Credits:

- Material developed by Greenstreet
- Modified and updated by Samuel Breedlove, Heidi Vasiloff P.C.

Activities:

Workshop by industry partners on various green materials and certification for VOC emissions.

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Module 8: Energy and Atmosphere

Description:

science, various aspects of energy efficiency and integrated design. It provides a comprehensive overview of the different systems and technologies and introduce the cutting edge innovations in building practices.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Expected Outcomes:

Upon successful completion of this course, a student would be able to:

1. Enlist various best management practices for energy efficiency.
2. Discuss various requirements for minimum energy efficiency performance and the credits awarded for optimized performance.
3. Discuss requirements for refrigerant management as well as identify the refrigerants permitted by LEED.
4. Identify requirements for measurement and verification for new construction.
5. Discuss requirement for commissioning of existing buildings and the process involved in the same.
6. Discuss techniques and strategies for performance measurement of existing buildings through a building automation system as well as system level metering.
7. Identify opportunities for on-site and off-site renewable energy as well as credits gained through the same.
8. Carry out an effective emission reduction reporting.
9. Identify opportunities for green power purchase as well as create a policy for the same.

Module 8: Energy and Atmosphere Outline		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1	Energy Efficiency Best Management Practices • Planning • Documentation • Opportunity Assessment	
2	Minimum Energy Efficiency Performance and Optimized Energy Efficiency	
3	Fundamental Refrigerant Management and Enhanced Refrigerant Management	
4	New Construction : Measurement and Verification • Base Building • Tenant Sub metering	
5	Existing Building Commissioning • Investigation and Analysis • Implementation • Ongoing Commissioning	
6	Existing Building: Performance Measurement • Building Automation System • System Level Metering	
7	On-Site and Off-Site Renewable Energy	
8	Emission Reduction Reporting	
9	Green Power	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at www.usgbc.org.

Credits:

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Module 9: Professional Conduct

Description:

Weatherization work involves communication with client as well as tedious inspection works in the attic. Raters should be proficient in both sides of work and

client as well as employer. Hence this class provides adequate inspection protocol to perform well not only at home audits but also at job interviews and all client communications, and to sharpen interpersonal and communication skills.

Certification(s):
LEED Green Associate

Prerequisite: None

Required Materials: None

Credit Hours: 1

Expected Outcomes:

Upon successful completion of this course a student would be able to:

1. Portray themselves professionally.
2. Discuss the concept of professional ideals and would be more virtuous and responsible.
3. Develop appropriate interpersonal relationships, not just with client but also the employer.
4. Exhibit demeanor appropriate to their job at hand.
5. Identify aspects crucial for their professional growth as well as their limitations.
6. Have greater respect for professional and personal ethics.
7. Have greater respect for property and law.
8. Effective communicate, not just with a prospective employer, but also clients.
9. Conform to an adequate inspection protocol to perform well not only at home audits but also in at job interview and all client communications.

Module 9: Professional Conduct Outline		
Expected Outcome	**Topic**	**Suggested Activities or Resources**
1 - 10	**Professional Conduct** 1. Professional conduct 2. Professional ideals • Clinical virtues • Conscientiousness • Collegiality/cooperation • Objectivity • Responsibility to community 3. Interpersonal relationships 4. Appropriate demeanor. 5. Honesty and integrity 6. Professional growth and awareness of limitations 7. Respect for personal and business ethics 8. Respect for property and law 9. Protocol with respect to interpersonal communication 10. Communication – with clients as well as employers	

This course aligns with National Recognized Certifications in Green Building Design. For testing information go to: The U.S. Green Building Council's LEED website at *www.usgbc.org*.

Credits:

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