GUIDELINES FOR APPROVING AIA/CES SUSTAINABLE DESIGN COURSES

Mandatory continuing education in sustainable design demonstrates one way that the AIA and its members are committed to leading the way toward carbon neutrality in buildings. Actions by the AIA will support members in strengthening their resolve and facilitate their continuing professional development in this growing mainstream area of practice.

Architects have a unique opportunity to lead positive changes in the building industry. Market forces and pressure from clients demand sustainable design and energy efficient buildings with demonstrated returns on investment position.

AIA Architect members need to be well-informed about and have access to up-to-date sustainable design techniques and business practices so they can best serve their clients and be on the forefront of the global market transformation. Architects must maintain an awareness of initiatives in the rapidly developing codes and standards set at national, state, and local levels and increase their expertise in these areas.

Sustainable design learning units must address the definition of sustainability AND focus on at least one of the qualifying topics listed below.

Sustainability and Sustainable Design Defined

Sustainability is the concept of meeting present needs without compromising the ability of future generations to meet their own needs.

Sustainable design is achieved through an integrated design and delivery process that enhances the natural and built environment by using energy sensibly with a goal toward carbon neutrality, improves air and water quality, protects and preserves water and other resources, and creates environments, communities and buildings that are livable, comfortable, productive, diverse, safe and beautiful to stir our imagination.

Sustainable Design Qualifying Topics

The following content areas will meet the AIA's Sustainable Design continuing education. Keep in mind that each content area must be supported by appropriate learning objectives that relate the content to a learning activity. The basis for program's content qualifying for sustainable design learning units is found in the AIA *COTE Top Ten* and the Sustainability Discussion Group's (SDiG), *50>>50*. The *COTE Top Ten* is the Committee on the Environment's (COTE) measure of sustainable design. The *50>>50* represent a product of the Institute's Sustainability Discussion Group, a task group of the AIA Board of Directors that was formed early in 2007 to seek action on the critical, focused, measurable, and achievable priority of carbon reduction.

Subject areas based on the AIA *COTE Top Ten,* are supplemented by the AIA's *50>>50* content areas. For full information about each of the *50>>50*content areas, please refer to the AIA publication, *50 >>50*, found at http://www.aia.org/fiftytofifty.

The following list of applicable *COTE Top Ten* sustainable design subject areas and *50>>50* qualifying content areas are provided as a guideline for content areas that meet the sustainable design program requirements.

I. Sustainable Design Intent and Innovation Sustainable design is an inherent aspect of design excellence. Projects should express sustainable design concepts and intentions, and take advantage of innovative programming opportunities.

TOPICS

5 Building Form
19 Energy Modeling
26 Integrated Project Delivery
32 Passive Solar Collection Opportunities
34 Preservation/Reuse of Existing Facilities
37 Rightsizing Equipment
39 Space Zoning
41 Sun Shading
44 Thermal Bridging
46 Vegetation for Sun Control
47 Walkable Communities
48 Waste-Heat Recovery
50 Windows and Openings
Other appropriate topics include:
-Biomimicry

II. Regional /Community Design and Connectivity Sustainable design values the unique cultural and natural character of a given region.

TOPICS

3 Alternative Transportation
4 Appropriate Size and Growth
31 Open, Active Daylit Spaces
32 Passive Solar Collection Opportunities
34 Preservation/Reuse of Existing Facilities
36 Renewable Energy Resources
46 Vegetation for Sun Control
47 Walkable Communities
49 Water Conservation
50 Windows and Openings
Other appropriate topics include:
-Zoning, regulatory, codes

III. Land Use and Site Ecology Sustainable design protects and benefits ecosystems, watersheds, and wildlife habitat in the presence of human development.

TOPICS

3 Alternative Transportation
4 Appropriate Size and Growth
7 Building Orientation
15 Daylighting
16 Earth Sheltering
18 Efficient Site Lighting Systems
23 Geoexchange
24 Green Roof
28 Mass Absorption
30 Natural Ventilation
32 Passive Solar Collection Opportunities
34 Preservation/Reuse of Existing Facilities
41 Sun Shading
46 Vegetation for Sun Control
47 Walkable Communities
49 Water Conservation
50 Windows and Openings
Other appropriate topics include:
-Safety & Security Systems (defensive planting, innovative design, defensive space)

IV. Bioclimatic Design Sustainable design conserves resources and maximizes comfort through design adaptations to site-specific and regional climate conditions.

TOPICS

5 Building Form
7 Building Orientation
13 Cool Roofs
15 Daylighting
16 Earth Sheltering
23 Geoexchange
24 Green Roof
28 Mass Absorption
30 Natural Ventilation
31 Open, Active Daylit Spaces
32 Passive Solar Collection Opportunities
38 Smart Controls
39 Space Zoning
41 Sun Shading
44 Thermal Bridging
46 Vegetation for Sun Control
47 Walkable Communities
49 Water Conservation
50 Windows and Openings

Other appropriate topics include:
-Biomimicry

V. Light and Air Sustainable design creates comfortable interior environments that provide daylight, views, and fresh air.

TOPICS

6 Building Monitoring
15 Daylighting
17 Efficient Artificial Lighting
30 Natural Ventilation
31 Open, Active Daylit Spaces
41 Sun Shading
46 Vegetation for Sun Control
50 Windows and Openings

Other appropriate topics include:
-Indoor Environmental Quality

VI. Water Cycle Sustainable design conserves water and protects and improves water quality.

TOPICS

11 Conserving Systems and Equipment
21 Energy-Saving Appliances and Equipment
23 Geoexchange
24 Green Roof
46 Vegetation for Sun Control
49 Water Conservation

Other appropriate topics include:
-Embodied Water

VII. Energy Flows and Energy Futures Sustainable design conserves energy and resources and reduces the carbon footprint while improving building performance and comfort. Sustainable design anticipates future energy sources and needs.

TOPICS

1 Active Solar Systems
2 Alternative Energy
5 Building Form
6 Building Monitoring
8 Carbon Offsets
10 Co-Generation
11 Conserving Systems and Equipment
13 Cool Roofs
15 Daylighting
16 Earth Sheltering
17 Efficient Artificial Lighting
18 Efficient Site Lighting Systems
19 Energy Modeling
20 Energy Source Ramifications
21 Energy-Saving Appliances and Equipment
23 Geoexchange
24 Green Roof
25 High-Efficiency Equipment
27 Life Cycle Assessment
28 Mass Absorption
29 Material Selection and Embodied Energy
30 Natural Ventilation
32 Passive Solar Collection Opportunities
33 Photovoltaics
35 Radiant Heating and Cooling
36 Renewable Energy Resources
37 Rightsizing Equipment
38 Smart Controls
39 Space Zoning
41 Sun Shading
42 Systems Commissioning
43 Systems Tune-Up
44 Thermal Bridging
45 Total Building Commissioning
46 Vegetation for Sun Control
48 Waste-Heat Recovery
49 Water Conservation
50 Windows and Openings

VIII. Materials and Construction Sustainable design includes the informed selection of materials and products to reduce product-cycle environmental impacts, improve performance, and optimize occupant health and comfort.

TOPICS

9 Cavity Walls for Insulating Airspace
12 Construction Waste Management
13 Cool Roofs
14 Deconstruction and Salvage Materials
21 Energy-Saving Appliances and Equipment
25 High-Efficiency Equipment
27 Life Cycle Assessment
28 Mass Absorption
29 Material Selection and Embodied Energy
33 Photovoltaics
35 Radiant Heating and Cooling
37 Rightsizing Equipment
44 Thermal Bridging
45 Total Building Commissioning
46 Vegetation for Sun Control
50 Windows and Openings

Other appropriate topics include:
-Indoor Environmental Quality
-Biomimicry
-Prefabrication
-Green Specifications

IX. Long Life/Loose Fit Sustainable design seeks to enhance and increase ecological, social, and economic values over time.

TOPICS

14 Deconstruction and Salvage Materials
34 Preservation/Reuse of Existing Facilities
29 Material Selection and Embodied Energy
39 Space Zoning
45 Total Building Commissioning
50 Windows and Openings

X. Collective Wisdom and Feedback Loops Sustainable design strategies and best practices evolve over time through documented performance and shared knowledge of lessons learned.

TOPICS

6 Building Monitoring
19 Energy Modeling
22 Environmental Education
26 Integrated Project Delivery
27 Life Cycle Assessment
34 Preservation/Reuse of Existing Facilities
38 Smart Controls
40 Staff Training* (Technical Training)
42 Systems Commissioning
43 Systems Tune-Up
45 Total Building Commissioning

Other appropriate topics include:

- Contract Documents related to sustainable design

*Staff training is related to applying knowledge gained from reviewing prior projects (feedback loops) or verifying prior outcomes of projects. This material shall not include "train the trainer" type learning.

Sustainable Design Program Qualification

Each program must meet the requirement of having at least 75 percent of the content and instructional time designed to cover sustainable design content areas. You will be asked to certify that on the Form A when submitting the course for approval. Some topics such as environmental education and staff training will normally not qualify for HSW. If your course or program is in these or related areas, it must clearly articulate the content, educational basis and rationale for requesting sustainable design program designation.

Sustainable Design and Health, Safety and Welfare (HSW)

It is the intent of these guidelines to ensure that knowledge that qualifies as sustainable design learning units focuses on the direct application of techniques and strategies which advance the concept of sustainable design as defined above. These topics all deal with or affect the health, safety and welfare of the public and our communities and as a result all learning units qualified as "sustainable design learning" shall simultaneously be approved as HSW learning.

Each program must meet the criterion that at least 75 percent of the session is spent on sustainable design topics, as defined.

Programs Offered Prior to January 1, 2009

Any program offered before January 1, 2009, that may meet the content and administrative requirements for sustainable design programs must be resubmitted using a Form A to qualify for the sustainable design program designation. Existing programs resubmitted for sustainable design program designation will carry that designation effective January 1, 2009. Note that all registered courses must be renewed every three years.

COTE Top Ten Measures

I. Sustainable Design Intent & Innovation

Sustainable design is an inherent aspect of design excellence. Projects should express sustainable design concepts and intentions, and take advantage of innovative programming opportunities.

- Key environmental issues; how and why they became important priorities
- Key ecological goals and concepts for your project and how they shaped your thinking (not a list of sustainable design measures)
- How these goals and concepts were expressed in the design
- Sustainable design innovations
- How sustainability measures led to a better overall project design
- Process of program analysis and any resource efficiencies realized by innovation

II. Regional/Community Design & Connectivity

Sustainable design values the unique cultural and natural character of a given region.

- How the design relates to the local context and to larger regional issues
- How the design promotes regional and community connectivity and sense of place, public space and community interaction
- Transportation policies, incentives, and other efforts to provide for those using transportation alternatives
- Site selection criteria to reduce automobile use
- How mandated parking was reduced

III. Land Use & Site Ecology

Sustainable design protects and benefits ecosystems, watersheds, and wildlife habitat in the presence of human development.

- How the development of the project's site responds to its ecological context, including the watershed, and air and water quality at different scales from local to regional level
- How the development of the immediate site and its buildings contribute to environmental quality
- How the design accommodates wildlife habitat preservation and creation
- How the landscape design protects or creates on-site ecosystems
- How the design responds to local development density (rural to urban) or conditions (brownfield to greenfield)

IV. Bioclimatic Design

Sustainable design conserves resources and maximizes comfort through design adaptations to site-specific and regional climate conditions. Describe how the building responds to local climate, sun path, prevailing breezes, and seasonal and daily cycles through passive design strategies.

- Site and climatic analysis
- Description of internal versus external building loads
- Design strategies that reduce or eliminate the need for non-renewable energy resources
- How these strategies specifically shaped the building plan, section, and massing
- How these strategies specifically affected placement, orientation, and shading of the building

V. Light & Air

Sustainable design creates comfortable interior environments that provide daylight, views, and fresh air.

- Design strategies for daylighting, task lighting, ventilation, indoor air quality, views, and personal control systems
- How the project's design enhances connections between indoors and outdoors
- Design team approach to integration of natural systems and appropriate technology

VI. Water Cycle

Sustainable design conserves water and protects and improves water quality.

- How building and site design strategies manage site water and drainage, and capitalize on renewable sources (such as precipitation) on the immediate site
- Water-conserving landscape and building design strategies
- Reuse strategies for water including use of rainwater, graywater, and wastewater

VII. Energy Flows & Energy Future

Sustainable design conserves energy and resources and reduces the carbon footprint while improving building performance and comfort. Sustainable design anticipates future energy sources and needs.

- How the building design reduces energy loads for heating, cooling, lighting, and water heating
- How the design and integration of building systems contributes to energy conservation and reduced use of fossil fuels, reduces green house gas emissions and other pollution, and improves building performance and comfort
- Techniques for systems integration, use of controls and technologies, efficient lighting strategies
- Use of on-site renewable and alternative energy systems

- Anticipation of future and carbon neutral fuel sources
- Strategies to reduce peak electrical demand
- How the building or parts of the building provide "passive survivability" : the ability to function in the event of power outages or interruptions in fuel supply

VIII. Materials & Construction

Sustainable design includes the informed selection of materials and products to reduce product-cycle environmental impacts, improve performance, and optimize occupant health and comfort.

- Efforts to reduce the amount of material used on the project
- Materials selection criteria, considerations, and constraints, such as optimizing health, durability, maintenance, and energy use, and/or reducing the impacts of extraction, manufacturing, and transportation
- How the building enclosure will perform in relationship to air, moisture, water and thermal characteristics
- Consideration given to impacts on the environment over the full life cycle and the results of life cycle assessment if available
- Description of any "green lease" program
- Construction waste reduction plans and any strategies to promote recycling during occupancy

IX. Long Life, Loose Fit

Sustainable design seeks to enhance and increase ecological, social, and economic values over time.

- How the project was designed to promote long-term flexibility and adaptability
- Anticipated service life of the project, and description of any components designed for disassembly
- Materials, systems, and design solutions developed to enhance versatility, durability, and adaptive reuse potential

X. Collective Wisdom & Feedback Loops

Sustainable design strategies and best practices evolve over time through documented performance and shared knowledge of lessons learned.

- How you modeled and evaluated the design during the programming and design phases
- How you evaluated the performance of the built results
- Collaborative efforts between the design team, consultants, client, and community
- How the process enhanced the performance and success of the building
- Lessons learned during the design, construction, and occupation of the building
- How these lessons would change your approach to this project if starting over, or to future projects
- Commissioning and any on-going monitoring of building performance and occupant satisfaction

50>>50 Descriptions

1 Active Solar Thermal Systems

Active solar thermal systems use solar collectors to collect the sun's energy to heat water, another fluid, or air including soar service water, ventilation preheat and space heating.

2 Alternative Energy

Alternative energy is energy derived from natural sources that does not use up those sources and that has minimal environmental impact such as geothermal, wind power, hydropower and wave action generation.

3 Alternative Transportation

Alternative Transportation includes bicycles; car sharing; electric, flexible fuel, and hybrid vehicles; hypercar; light electric vehicles: motorized bicycle; paratransit; plug-in hybrid electric vehicle (PHEV); public transportation; ridesharing/dynamic ridesharing; zero-emissions vehicle (ZEV); sustainable transportation movement; transit-oriented development; clean fleet guide; carbon offsets; walkable communities

4 Appropriate Size and Growth

Appropriate Size and Growth includes the planning issues regarding urban sprawl and the smart growth movement, as well as the programming of appropriately sized individual buildings. Design spaces and services to support new functions and reuse for easy and rapid spatial change.

5 Building Form

Building Form defines the space that shelters our interior human activity and the negative space, the void between building forms, shapes our exterior human activities in the built environment. It is an integrated design process to balance site/natural, economic, and programmatic building form determinants to enhance building performance. Building information modeling (BIM) and energy simulation software are used to understand and predict the effect of building form on energy use for various design concepts in the early stages of design.

6 Building Monitoring

Building Monitoring ensures that all building systems operate at peak efficiency. Techniques include: controls; design tools; adequately trained personnel; green building rating tools; energy policy act; and periodic recommissioning.

7 Building Orientation

Building Orientation strongly relates a building to the natural environment—the sun, wind, weather patterns, topography, landscape, and views.

8 CARBON OFFSETS

Carbon Offsets include funds used to mitigate the impacts of greenhouse gas (GHG) emissions by channeling corporations' and individuals' voluntary investments into projects that create carbon dioxide (CO2) savings equivalent to their CO2 emissions.

9 CAVITY WALLS FOR INSULATING AIRSPACE

Cavity Walls for Insulating Air Space applies to any layered wall system that uses an insulating air space and internal drainage plane to resist rainwater penetration.

10 CO-GENERATION

Cogeneration, also referred to as combined heat and power (CHP), is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat.

11 CONSERVING SYSTEMS AND EQUIPMENT

Conserving Systems and Equipment include design and control strategies for efficient system operation; and equipment options for efficient systems.

12 CONSTRUCTION WASTE MANAGEMENT

Construction Waste Management (CWM) minimizes and diverts construction waste, demolition debris, and land-clearing debris from disposal and redirects recyclable resources back into the construction process.

13 COOL ROOFS

Cool Roof is highly reflective and emits heat it has absorbed back to the atmosphere. A roof is defined as cool based on two radiative properties: solar reflectance and thermal emittance.

14 **DECONSTRUCTION AND SALVAGE MATERIALS**

Deconstruction and Salvage Materials - the process of taking a building apart piece by piece with the intent of recycling or salvaging as many of the building materials as possible.

15 DAYLIGHTING

Daylighting is a design strategy that employs the available daytime exterior light to illuminate the interior of buildings.

16 EARTH SHELTERING

Earth-sheltering structures building techniques include: benching - cutting or stepping into a slope to create building terraces or trenches; berming - piling of earth against the enclosing walls; and excavating - total or partially digging into the earth.

17 Efficient Artificial Lighting

Efficient Artificial Lighting produces the optimum lighting level for the task while using a minimum amount of electrical energy.

18 Efficient Site Lighting Systems

Efficient Site Lighting Systems provide the necessary level of light for visibility and safety while minimizing the amount of energy used to generate the lighting.

19 Energy Modeling

Energy modeling is the practice of using computer-based programs to model the energy performance of an entire building or the systems within a building.

20 Energy Source Ramifications

Energy Source Ramifications are inherent acts of construction, operations, and maintenance of the infrastructure of buildings use energy.

21 Energy-Saving Appliances and Equipment

Energy-Saving Appliances and Equipment apply efficiency standards in using energy-saving appliances and equipment for new construction, remodeling, or upgrading appliances and equipment in the building sector.

22 Environmental Education

Environmental Education increases public awareness and knowledge of environmental issues and challenges and the study of relationships between natural and human systems.

23 Geoexchange

Geoexchange uses the relatively consistent temperatures of deep earth for the heating and cooling of buildings through the use of ground-source heat pumps (GSHPs), also known as geothermal heat pumps or geoexchange heat pumps. Techniques include open loop and closed loop; water to air; and water to water.

24 Green Roofs

Green Roofs are building roofs that are partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane. A green roof may also include additional layers such as a root barrier and drainage and irrigation systems. Green roof may also be used to refer to roofs that incorporate some form of green technology, such as solar panels or photovoltaic modules. Green roofs are also referred to as eco-roofs, vegetated roofs, living roofs, and greenroofs.

25 High-Efficiency Equipment

High-Efficiency Equipment based on design and functionality consumes far less energy over time than conventional equipment that performs the same function.

26 Integrated Project Delivery

Integrated Project Delivery integrates the knowledge and experience of designers, constructors, owners and operators in a collaborative design process to achieve high-performance buildings.

27 Life Cycle Assessment

Life Cycle Assessment (LCA) is a cradle-to-grave analysis and evaluation of the environmental impact of a product or service throughout its lifespan.

28 Mass Absorption

Mass Absorption refers to the process of storing energy in building materials commonly referred to as "thermal mass" for use at a later time.

29 Material Selection and Embodied Energy

Material Selection and Embodied Energy consider the immediate and long-term economic, environment, and health effects in the choice of materials. Embodied energy is a measure of the total energy consumed by a product during its life or complete life cycle.

30 Natural Ventilation

Natural Ventilation is an energy-efficient way to increase human comfort because air movement increases heat transfer from the skin when cooler outside air replaces warm and humid indoor air.

31 Open, Active, Daylit Space

Open, Active, Daylit Space considers indoor environments, especially attributes such as the amount and quality of light and color, sense of enclosure, sense of privacy, access to window views, connection to nature, sensory variety, and personal control over environmental conditions.

32 Passive Solar Collection Opportunities

Passive Solar Collection Opportunities are harvesting the sun's energy and using that energy for heating, cooling, daylighting, and water heating in buildings.

33 Photovoltaics

Photovoltaics (PV) is a technology in which sunlight is converted into electrical power.

34 Preservation/Reuse of Existing Facilities

Preservation/Reuse of Existing Facilities is saving old and historic buildings, sites, structures, and objects from destruction or deterioration, and providing for their continued use by means of restoration, rehabilitation, reconstruction, or adaptive reuse.

35 Radiant Heating and Cooling

Radiant Heating and Cooling is radiant energy is transferred directly to occupants and objects within a space.

36 Renewable Energy Resources

Renewable Energy Resources is the purchase "green" or renewable electricity generated off-site. It involves taking advantage of one of several methods to track renewable energy generation and stimulate more renewable energy-generating capacity.

37 Rightsizing Equipment

The Rightsizing Equipment concept is commonly applied to a building's heating and cooling (HVAC) systems and is a fundamental element in the integrated approach to building design.

38 Smart Controls

Smart Controls or intelligent controls are sophisticated devices that perform multiple functions and are used for energy management, HVAC and lighting systems control, and to alert operations and maintenance (O&M) personnel of impending equipment failure.

39 Space Zoning

Space Zoning spatial characteristics and functional requirements address design objectives — accessibility, aesthetics, cost-effectiveness, functionality, historic, productive, security/safety, and sustainability—and their interrelationships must be understood, evaluated, and appropriately applied within the spaces.

40 Staff Training (technical training)

Limited to Technical Training related to sharing lessons learned from the evaluation of prior applications, processes, procedures and decisions and how they affected the outcomes of proposed solutions.

41 Sun Shading

Sun Shading is the process of controlling the sunlight entering a building and addresses three basic categories of shading devices: landscaping, roof overhangs, and exterior or interior shading devices.

42 Systems Commissioning

Systems Commissioning is a quality assurance process to ensure that building systems perform as intended. Systems Commissioning refers to: HVAC systems and associated controls; lighting and daylighting controls; domestic hot water systems; and renewable energy systems. Systems Commissioning includes planning, delivery, verification, and managing risks to critical functions. Commissioning can take place during design, construction, and postoccupancy.

43 Systems Tune-Up

Systems Tune-Up involves identifying and fixing problems in existing buildings including lighting systems; envelope; controls; boiler; and heat exchanger tune-ups.

44 Thermal Bridging

Thermal Bridging occurs in building envelopes when relatively high thermal conductivity materials such as steel and concrete create pathways for heat loss that bypass thermal insulation.

45 Total Building Commissioning

Total Building Commissioning (TBCx) is a quality assurance process to ensure that the building as a whole—all of its components and systems—performs as intended. TBCx includes the building envelope, mechanical systems, structural, electrical, control, elevators, plumbing, and life safety systems.

46 Vegetation for Sun Control

Vegetation for Sun Control - Plants and trees used to reduce solar gain in buildings (when not desired), reducing mechanical loads, and thereby further contributing to carbon-reducing strategies.

47 Walkable Communities

Walkable Communities planned around people scaled to ensure that walking and cycling distances are convenient from home to school, work, and services. Walkable communities are scaled for sustainability of resources (both natural and economic) and locate goods (such as housing, offices, and retail) and services (such as transportation, schools, and libraries) that a community resident or employee needs on a regular basis within an easy and safe walk.

48 Waste-Heat Recovery

Waste-Heat Recovery refers to heat that is discharged as a by-product from one process to provide supplemental energy needed by another process. Typical examples of waste-heat recovery applications are preheating of combustion air, space heating, ventilation, water heating, boiler feed water, or process water.

49 Water Conservation

Water Conservation involves collecting, treating, and distributing potable water and the collection and treatment of wastewater for environmentally safe disposal back into our waterways.

50 Windows and Openings

Windows and Openings are designed in a building envelope to permit the passage of air, light, vehicles, or people. Windows and openings have the greatest impact on building occupants for daylighting, ventilation, thermal comfort, acoustics, and occupant well-being.

OTHER TOPICS

-Biomimicry
-Green Specifications
-Indoor Environmental Quality
-Prefabrication
-Contract Documents related to sustainable design
-Safety and Security Systems (defensive planting, innovative design, defensive space)
-Zoning, regulatory, codes