Green Design and Planning

"Only 60 years ago (1930), there were 2 billion of us... a total that had taken 250 million years to attain. Today, there are more than 5 billion (1990); and by 2025, there could be more than 10 billion."

Norman Myers

As we enter the 21st century, designers and planners are facing a new set of challenges, far more demanding than the issues of the past. The world population has tripled in less than a century. Most of the growth has occurred in emerging cities with few resources. Some African cities are now growing 10% a year. Architects and planners are entering a new environmental era, which focuses on green design, alternative energy, infrastructure, and planning systems that support sustainable development.

The greatest problems are occurring in emerging nations, enticed by the seduction of development. As their economies grow, they’re repeating the mistakes of old industrial nations. They’re investing in private cars, rather than public transportation. They’re utilizing more energy than ever before, and creating larger cities without the necessary infrastructure and resources.

Developed cities are also struggling with growth. The population of Tokyo is approaching thirty million people. London is fighting urban sprawl. New York is burdened with increasing costs. The population is stable, but the costs of maintaining century old systems has grown. In California, energy demands have reached epic proportions, but the California lifestyle continues to attract growth.

Architects and planners are responding to these issues by creating sustainable designs. In recent years, they’ve developed new concepts for green buildings, green masterplans, regional transportation, and new environmental technologies. Engineers have introduced controversial ideas like solar power satellites, wind powered skyscrapers, and transatlantic tubes. Innovative urban planners have created urban regional corridors, disbursed urban centers, artificial islands, and new underground systems.

This course introduces the issues of green design and planning through an arts workshop. It begins with a brief history of environmental issues from the 19th century industrial revolution to the present. It also traces the development of environmental solutions, such as public transportation, zoning laws, building codes, public parks, landscape systems, infrastructure, and planning theories. New concepts in green architecture, new materials like structural fabrics and plastic wood are also introduced.

The class also explores new solutions to urban and environmental problems, including concepts in green housing, town planning, urban masterplans, and resource development. Slide lectures analyze innovative planning approaches, such as artificial islands, disbursed urban centers, and mobile structures for emerging countries. Green buildings, based on LEED certification are also discussed.

Students develop several environmental projects, exploring issues of product design, architecture, and planning. They include the design of a roof terrace, creation of a recycled product, and analysis of an urban park. The assignments include writing, research, photographic studies, map studies, models, drawings, and computer images. Students should have access to a camera and basic drawing tools.
Required Reading taken from the following books:

McDonough, William, and Braungart, Michael, Cradle to Cradle, pages 3-186
Goodman, Donna, A History of the Future, pages 229-268

Recommended Reading on Environmental Topics

Dean, Angela M., Green by Design
Girardet, Herbert, Cities, People, Planet
Gissen, David, ed., Big and Green
Kunstler, James Howard, Geography of Nowhere
Mau, Bruce, Massive Change
Powell, Kenneth, City Transformed
Siegel, Jennifer, Mobile Architecture
Slessor, Catherine, Eco-Tech
Wines, James, Green Architecture

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Materials: Available at Blick’s, Pearl Paint, Lee’s Art Store, Utrecht, or other art supply stores

12” or 14” roll of inexpensive white tracing paper (typically 20 yds. )
24” T-square, (metal is better than wood) or a Parallel Rule, (Mayline is a good brand.)
Inexpensive Lead or Pencil Sharpener
Drafting Board (and board cover, if needed)
Design and Layout Kit or the following tools:  Lead holder and 2 Leads (H or 2H) or Pencils, H or 2H
Pencil Eraser and Ink Eraser
12” triangular architectural scale or standard 12” ruler
2 Triangles (30,60, 90 degrees and 45 degrees)

Students should also have access to a camera, computer, and modelbuilding tools.

Optional Materials: 11”x 17”mylar sheets, as needed, inexpensive technical pens, #0, #000, #2
Drafting Brush, Adjustable triangle, Erasing Shield, Bathroom/Kitchen Template

Criteria for Grading:  class participation in discussions
     depth of analysis of design issues
     concept and design development
     quality of visual & verbal presentations
     individual growth and improvement
     satisfactory completion of all projects

Note: Incompletes are only allowed in cases of illness or extreme necessity and must be planned before the last week of classes

Plagiarism: NYU has a strict policy on plagiarism, copying projects, and related issues. If any student is caught developing work in an illicit manner, there will be consequences. Please consult the Gallatin Bulletin or Gallatin website for a full description of the academic integrity policy. (http://www.gallatin.nyu.edu/academics/policies/policy/integrity.html)
Green Design and Planning: Outline of Topics

1. First Week: Introduction: The 21st Century Environmental Dilemma
   a. 21st Century Legacy: Overpopulation, Urban Expansion, New Demand for Products, Resources, Infrastructure, Global Economy, Pollution, Efforts at Environmental Law
   b. New Architecture and Construction Concepts; Visionary Proposals; Innovative Public Buildings
   c. Films: sequence The Art and Science of Renzo Piano
   d. Reading: McDonough and Braungart, pp. 3-44
   e. Assignment: Create a photographic essay on Washington Square Park with the following images:
      1. People and Functions: playgrounds, chess, bocci ball, picnic tables
      2. Art and Structures: buildings, statues, the arch, the fountain
      3. Landscape and Design Details: signs, furniture, types of trees and plants
      4. Park Problems: Crime, homelessness, garbage, bad usage of park space

2. Second Week: The Impact of the 19th Century Industrial Revolution; Early 20th Century Proposals
   a. The 19th Century Industrial Revolution: Railroads, Factory Conditions, Slum Housing, Pollution, Immigration, Growth of Cities, Building Codes, Parks
   b. Historical Projects: Howard’s Garden City, Garnier’s Industrial City, Wright’s Broadacre City
   c. Film: River of Steel and/or sequence from New York: A Documentary Film on Central Park
   d. Reading: McDonough and Braungart, pp. 45-91
   e. Assignment: Develop a masterplan of Washington Square Park. Make copies of the masterplan. Draw diagrams of the following planning concepts. Create a key for each map.
      1. Function: Create a map of major park functions, also show seating areas
      2. Landscape and Circulation: Create a map of landscaped areas and paths
      3. Structures and Art: Create a map indicating structures and public art
      4. Park Problems: Create a map designating park problems

3. Third Week: Nature and Urbanism
   b. Growth of Mass Production, Eames and Fuller, Levittown, Dependence on Automobiles
   c. Film: sequences from New York: A Documentary Film on Robert Moses
   d. Reading: McDonough and Braungart, pp. 92-141
   e. Assignment: Write an introduction to the booklet, which describes the history of the park and create a rendering from one of your photographs or a freehand drawing of the park.

4. Fourth Week: From the Space Age to Postmodernism: Issues Leading to a New Environmental Era
   a. Historical Development: Hi-Tech Design, ‘50’s Futurism, Failures of Modernism, Megastructure
   b. Postmodernism: Pop Architecture, Limits to Growth, Theme Parks, Urban Decay and Renewal
   c. Film: Portland: A Sense of Place and sequence from Koyaanisqatsi
   d. Reading: McDonough and Braungart, pp. 141-186
   e. Assignment: Create an idea for improving the park. Draw a plan and write a short statement.

5. Fifth Week: A New Environmental Era: Building Skins, Green Materials, and Related Concepts
c. Film: Greening the Federal Government
d. Reading: Goodman, pp. 229-268 on the evolution of green design principles
e. Assignment: Choose materials, develop details, diagrams, and historical references as discussed in class. Draw a site plan and refine the plan, based on critique. Draw an elevation.

   a. Public Transportation Systems, Subways, Light Rail, Highspeed Buses, Airplanes, Bicycles
   b. Private Vehicles: Electric Cars, Solar Cars, Hybrid Concepts; Water Transportation
   c. Film: sequence from Who Killed the Electric Car? or Paris: Velo Liberte
   d. Reading: Steffen, pp. 191-251 on cities and mobility
   e. Assignment: Create a three dimensional image of the concept, either an axonometric, a model, or a perspective sketch. As an alternative, create a more extensive information page on green design systems. Complete the booklet for final presentation next week.

7. Seventh Week: Transforming Traditional Business and Consumption Systems
   a. Market Systems: Cradle to Cradle Design vs. Cradle to Grave, Problems Caused by Global Trade
   b. Technological Alternatives, New Concepts in Design and Manufacturing
   c. Film: sequence from The Next Industrial Revolution
   d. Reading: Steffen, pp. 29-72 on consumption and global vs. local trade
   e. Assignment: “This is not a pipe.” Create a concept for reusing an object as a piece of furniture or another type of product. Develop plan, elevation, sketches, and text on the design.

8. Eighth Week: Green Products, Recycled Materials, Market Issues
   b. Marketing Environmental Principles, Development of Recycled Products
   c. Film: Super Use or Gray to Green
   d. Reading: Steffen, pp. 72-119 on new directions in design
   e. Assignment: Complete the product concept from the “This is not a Pipe” exercise. Revise the design based on critique. Illustrate an application and provide more information. Prepare for final presentation next week.

   a. Big and Green: Designing Largescale Structures, Green Mechanical Systems and Furnishings
   b. Spatial Planning, Layering Systems to Achieve Environmental Efficiency in Architecture
   c. Film: The Green Apple
   d. Reading: Steffen, pp. 121-189 on green systems, energy grids, and buildings
   e. Assignment: Create a model, based on spatial organization and kit-of-parts concepts explored in class. Do not glue down the pieces; they will be used to develop experiments. Create spatial layouts based on the grid, linear, centralized and organic concepts. Make a record of your final layouts, using the system described in the handout.

10. Tenth Week: Green Roofs, Applying Art and Political Activism to Transform Urban Spaces
    a. Reinvigorating Depressed Urban Areas, Reducing Carbon Emissions, Zoning through Time
    c. Film: Bogota: Building a Sustainable City
d. Reading: Steffen, pp. 383-442 on environmental politics

Assignment: Create a concept for a roof terrace on an NYU building, overlooking Washington Square. Develop a program for its use, a floor plan, and a parti or design concept. Write an introduction to the project. Begin researching materials and furnishings.

11. Eleventh Week: Disaster Relief and Solutions for Struggling Communities

a. Struggling Communities: Devastation Caused by War, Environmental Disasters, Emerging Cities
b. Mobile Design: Portable Schools and Medical Facilities, Refugee Housing, Kit-of-Parts Systems
c. Film: Energy for a Developing World
d. Reading: Steffen, pp. 305-349 on emerging communities and disaster relief
e. Assignment: Rework the plan, based on class discussion. Create an elevation, and an axonometric or perspective drawing of the design. Choose products for materials and furnishings.

12. Twelfth Week: Thanksgiving Week: Individual Critiques

a. Review individual design and discuss drawings, materials, and furnishing concepts.
b. Reading: Steffen, pp. 11-26, 351-381 on individual responsibility and business practices
c. Assignment: Redevelop the plan, elevation, and axonometric or perspective drawing. Review ideas for green furniture, art, lighting, materials, details, and landscaping. Create a page on materials and furnishings that includes information on green principles.


a. Urban Theories for Emerging Areas; Multiple Transportation Systems, Vitality of the Slums
b. New Town Planning Issues, Relationship of New Suburban Towns to Exploding Urban Centers
c. Film: China: From Red to Green
d. Reading: Steffen, pp. 253-304 on social issues of community in emerging areas
e. Assignment: Complete the booklet. Finalize architectural drawings, introduction, pages on parti or design concept, historical references, materials and furnishings, function, and spatial organization. Assemble the booklet. Prepare for final presentation.

14. Fourteenth Week: Final Presentations

Note: Aspects of the schedule may change, depending on availability of films and the development of student projects. The schedule may also be affected by the availability of a guest speaker.
PROJECTS: ANALYSIS OF WASHINGTON SQUARE PARK

The NYC Parks Commission is interested in improving Washington Square Park. They have asked for proposals, examining the existing conditions and providing ideas for improvements. They may want to add a kiosk, a work of art, or landscaping. Proposals must begin with an analysis of current conditions.

First Week: Create a photographic essay of Washington Square Park. Develop one 11” x 17” page on each topic listed below. Write a title and add a few paragraphs of text on each page.

1. Art and Structures: art, buildings, fountains, major spaces
2. Landscape and Paving: trees, grass, hedges, bushes, flowers, stones, paving, seating
3. People and Functions: playground, chess, dog run, general seating, other activities
4. Issues and Problem Areas: the homeless, areas not being used, awkward signs or fences

Second Week: Develop a masterplan of Washington Square Park. The plan can be created by walking through the park or looking down at the park from Kimmel or another building on Washington Square. Since the layout is somewhat symmetrical, some areas of the plan can be reproduced from a template of one area. Make 6 copies of the basic masterplan. Draw diagrams of the following planning concepts. Create a key for each map.

1. Function: Create a map of major park functions, also show seating areas
2. Landscape and Circulation: Create a map of landscaped areas and paths
3. Structures and Art: Create a map indicating structures and public art
4. Park Problems: Create a map designating park problems

Third Week: Write an introduction to the booklet, which describes the history of the park and a description of its current use and significance. Choose a photograph that best expresses your idea of Washington Square Park, for the cover of your booklet. Create a rendering from your photograph or a freehand drawing of the park. The rendering can be developed by tracing a photograph of the park and developing the image in pencil or ink. Color may be added after the black and white drawing is complete. Photoshop can be used if a student is uncomfortable with drawing. To create the rendering:

1. Print a copy of a photograph of the park.
2. Create a line drawing in either ink or pencil. Make several photocopies of the line drawing for the purpose of conducting experiments.
3. Do several short experiments, in ink or pencil, to determine which medium you will use. Create a “slice of the rendering” to explore the development of light and shadow. Express black, white, and at least three shades of gray, if using pencil. If using ink, show various degrees of light and dark areas through dots or lines.
4. Experiment with various methods of depicting a tree, grass, sky, water, and other elements in the photograph. Choose a style of drawing that best expresses the concept.

Optional: If you’d like to try color, experiment on another copy with colored pencils or markers.
Fourth Week: Create a proposal for improving the park. Write a description of your concept and draw a plan of the concept. Indicate the location of your proposal on an unused map. You can choose to either create a new structure in the park, like a small outdoor theater, a snack bar, a pavilion, or a bicycle storage area. If you don’t wish to design a structure, you can introduce a work of art, improve a system, such as signage, lighting, or trash collection, or work on a paving and landscaping issue.

Fifth Week: Choose materials, develop details, diagrams, and historical references as discussed in class. Refine the plan and site plan, based on critique. Draw an elevation.

Sixth Week: Create a three dimensional image of the concept, either an axonometric, a model, or a perspective sketch. As an alternative, create a more extensive information page on green design systems. Complete the booklet for final presentation next week.

THIS IS NOT A PIPE

The Dadaists, particularly Marcel Duchamp, created controversial art, by taking objects out of their usual context and displaying them as art in an exhibition. A chair was no longer a chair, but a work of art. An ordinary brush was no longer a brush, but a work of art.

In 1926, Rene Magritte made a painting of a pipe, but then added the words, "This is not a pipe," to the bottom of his painting. His words raised several questions. If it’s not a pipe, what else can it be? Is it a well designed object appropriate for another use?

In the current context, this concept could be applied to the idea of recycling. Millions of products are discarded each year without any consideration of their potential reuse. In this exercise, “This is not a pipe,” serves as a basis for suggesting that most products could be redefined as something else, rather than discarded after their initial use has been completed.

Assignment

1. You have just been hired to design a product for recycling. Choose an object that is well-designed and invent another use for this object, after it has been discarded. Write a few paragraphs describing how the object can be reused. Include a brief analysis of the relationship between the old design and function of the object and the new design and function. Describe how the object would be altered to prepare it for reuse; also describe the materials, colors, and details of the design.

2. Create at least two pages of sketches and written material. The first page should describe the existing object; it could include a photograph or a sketch, descriptions of its use, information on the materials and the manufacturing process, and statistics on the number of products discarded each year. The second page should describe the new use of the object and should include drawings of the new product, showing a plan and an elevation of the object. Also include a sketch of the object being used in the manner your proposal has described. Use two 11” x 17” sheets of paper to present your work.
SPATIAL ORGANIZATION

In this exercise, the design process is experienced through a three dimensional exercise, exploring forms and spatial organizations. It begins with the construction of a massing model, a kit-of-parts, which will serve as a basis for experimenting with various spatial arrangements. The massing model will include several groups of Platonic solids in a variety of sizes and shapes. Using paper, foam core, clay, or cardboard, create the following pieces:

Platonic Solids

1. six cubes .....................………. 1" wide x 1" deep x 1" high
2. two cylinders ......................…. 2" high x 1" diameter
3. two pyramids ....................... 2" high x 1"x 1" square base
4. four tall rectangular boxes........... 3” high x 1” x 1” square base

Base: Make a base for the model in cardboard or foam core, 11”x 17.” Draw a 1”x 1” grid on the base

1. Layout a design for each of the following spatial arrangements, using the model to explore various possibilities. Do not glue the pieces. Keep them free for further exploration and presentation of designs
   a. create a plan that emphasizes the grid
   b. create a plan that emphasizes a centralized concept
   c. create a plan that has an organic concept
   d. create a plan that uses a linear concept

2. Draw a plan of each concept, so that you’ll remember each design. Begin by making at least 4 copies of the grid base, then indicate the location of pieces for each layout in following manner:
   a. a square represents a cube
   b. a circle represents a cylinder
   c. a triangle represents a pyramid
   d. a rectangle represents a rectangular shaped piece

ROOF TERRACE

You have been asked to create a design for a roof terrace on an NYU building, overlooking Washington Square. The new facility should provide a place for students to enjoy a view of the park and work or relax in an outdoor environment. The program allows the designer to create a small indoor snack bar on the roof or another type of small indoor space in addition to the outdoor facilities. The outdoor space should include sitting areas, plants, and other appropriate elements.

First Week: Create a concept for the roof terrace. Is it a quiet space for study, a lively space for social events, or space dedicated to a particular use, such as a sculpture garden or a special type of planted area. Develop a parti or design concept for the terrace; it could be based on the spatial organization concept, the use of the new space, or a design idea. Write a short introduction to the project. Describe the site, program, and basic concept of the design. Draw a floor plan of the concept at ¼ " = 1'-0.” Include a parapet wall, which is 3.5’ high.
Second Week: Rework the plan, based on the critique. Draw an elevation and an axonometric or perspective drawing of the space. Begin research on materials, plants, and furniture for the roof terrace. Explore new concepts online for green elements and materials.

Third Week: Redevelop the plan, elevation, and axonometric or perspective drawing, based on the critique. Review ideas for green furniture, art, lighting, materials, plants, and other landscaping. Create a page on materials and furnishings that includes information on green principles and techniques.

Fourth Week: Complete the booklet. Finalize the architectural drawings, introduction, and pages on parti or design concept, historical references, materials and furnishings, function, and spatial organization. Assemble the booklet. Prepare for a final presentation. If possible, use the Google program, Sketch-up, to create additional drawings.

Creating a Model: Though no model is required, students sometimes are interested in creating a basic white model of their design instead of a three dimensional drawing. The following description provides an introductory system for building a model.

The art of modelmaking is used to provide a clearer understanding of the building mass and three dimensional concept of the design. There are several types of models, which can be developed within the design process. A site model shows how the building fits into a landscape or urban neighborhood. A study model provides a rough construction of the basic forms. It illustrates the basic proportions of the building, but shows no details, materials, or textures. Study models can be created at various stages of the design process. A final model shows the shape of a building, as well as the materials and details. It is sometimes placed on a small reproduction of the site.

As an alternative to a three dimensional drawing, this project could include a study model of the design. It will be built towards the end of the project to portray the general concept of the design. It is a white model that will not show the materials utilized in the building, but it will provide a clear expression of the three dimensional concept. The model can be built in either cardboard or foamcore.

1. Create a base for the model. Choose a firm material that will provide a stable base for the model. Cut a shape that is a little larger than the site of the building.

2. Make a copy of the floorplan of your project. Glue it onto the base of the model.

3. Make copies of your elevations. Cut walls to fit the exterior walls of your building. Glue the copies of the elevations onto the walls that you have made. Cut holes in the window areas of the walls or glue gray paper onto the window areas. Attach the completed walls onto the floorplan of the building.

4. Draw a roof plan or axonometric of the exterior of the building. If it is a pitched or curved roof, draw each section of the roof before cutting it, to determine the true size of the roof.

5. Build special details, like a chimney, using plans and elevations of each detail. Glue them onto the model. Outdoor furniture and plants are optional and could be made in a variety of informal materials.