

Design Certification Course Outline

-Introduction

Introductions by participants – brief background and course expectations
Course administration, timetable and scheduling
Using the Designers' Manual as a text-book for the course & other available references

-About Permaculture

Definition of permaculture, why do we need such a design system?
The evidence of why we need to act, key global challenges
History and philosophy of permaculture as a taught and applied design system
The Ethics and The Principles
Permaculture in landscape, society and community context
The Bill of Human Rights
Principle summary

Exercises in parenthesis in each segment

6 'from the hip' site designs, on an overhead or flip-chart done by instructors with students input. Use actual maps/sketches of student's property. This is intended to be brisk, lively, brainstorming. Instructors give their knowledgeable opinions and assessments of different ideas. These designs will key into specific chapter and theme headings (for ex: water will be the focus of the particular student's design)

2-4 Handouts (should be in digital form and collected for a single CD for students)

-Most Recommended Books by Instructor:

-Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
-Fukuoka, A *One Straw Revolution*, Other Indian Press, Goa, India, 1978.
-Lyle, John, *Regenerative Design for Sustainable Development*, John Wiley and Sons Inc, NYC, 1994.

-Concepts, Themes and Methods of Design

Learning Objectives: In this unit students will learn how to make initial observations in the landscape and, through a series of activities (i.e. analysis, data overlay, zoning, etc.), learn how to apply observations to a basic design. They will learn to read maps, delineate a basic zone and sector diagram, utilize methodologies such as relative location, efficient energy planning, diversity, etc. when thinking through their initial drawings. They will make their first attempt at putting down a basic design on paper.

Permaculture is about whole systems, not about separate components. Because each element in a landscape or the built environment affects every other element at a site, we believe that a complete, comprehensive assessment is tantamount to develop healthy, productive, energy efficient relationships between elements for the benefit of everyone involved in day to day operations. By paying attention to all the details: topography, climate, water, wind, sun, activity nodes and corridors, buildings, machinery and tools, the waste stream, plants and animals, it enables us to make best use of what is already on the ground, and what we intend to put there. With a dynamic interaction of elements in process, and an assessment of both spatial and temporal attributes, organized around sound ecological principles, we can maximize yields and balance the landscape.

Tradition, culture and belief systems
Life principles and natural laws stated
The methods of design, resources, yields, cycles, food webs, growth
Vegetarianism and dietary 'isms
Complexity, connections, order and chaos, permitted and forced functions
Inter-active diversity, stability, fertility, sustainable productivity and profitability, time and yield
Functional Design Development – Analysis, Observation and Deductions from nature
Sector Planning (***draw a circle around you on the ground and track outgoing and incoming energies on the site***)

Slope, Key Points, orientation, aspect, data overlay (**use measuring tools to determine these factors**)
Zones and their placement.

Designing in zones 1, 2, 3, 4 and 5

Random assembly of element lists and subsets cross referenced.

Flow diagrams, options and decisions,
incremental design and guilds.

Succession, evolution, establishment and maintenance (**Identify the natural succession of the plant life on the site or in the local bioregion; sketch it; identify plants**)

Principle summary and summary of design methods

The Cultivated ecology, practical procedures of property design (**Site recommendations for plants and how they will integrate with current vegetation**)

2-4 Handouts

Most Recommended Books:

-McHarg, Ian, *Design With Nature*, American Museum of Natural History, Garden City, NY, 1969.

-Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.

-Van der Ryn, Sim and Cowan, Stuart, *Ecological Design*, Island Press, Washington DC, 1996.

-Yeang, Ken, *Designing With Nature*, McGraw Hill, Inc., NYC, 1995.

-Lynne, Elizabeth and Adams Casandra, *Alternative Construction*, John Wiley and Sons, NYC, 2000.

-Nabokov, Peter and Easton, Robert., *Native American Architecture*, Oxford University Press, NYC. 1989.

-Oliver, Paul, *Dwellings: The House Across the World*, University of Texas Press, Austin, Texas, 1990.

-Snell, Clark, and Calahan, Tim, *Building Green*, Lark Books, NYC, 2005.

-*Appropriate Technology Sourcebook*, Volunteers in Asia Publication, Stanford, California, 1993.

-Kemp, William, *The Renewable Energy Handbook*, New Society Publishers, BC, Canada, 2005.

-Pattern understanding

Learning objectives: in this unit students will learn to recognize a diversity of patterns in the landscape through astute and focused observation. Charts and drawings will be presented representing patterns and processes found throughout the natural and created world. We will discuss the spiral and tree form, and shapes thereof, as the basis for all design and movement in the landscape. We will attempt to find a unified expression of geometrical and artistic understanding that will help us to perceive and conceive with the eyes and ears of the artist. Exercises in observation, discussion of what we have observed, and how these observations can be placed within a general pattern understanding, will be discussed. We will also look at how we can utilize what we find, through our observations and understanding, in our designs.

(**Identification of current/potential local use of patterning in relation to key survival information**)

Patterns in nature listed as form, the core model pattern, properties of media

Universal patterns micro to macro, matrices and the strategies of compacting and complexing components

Pattern in design, edge effect, boundary conditions, harmonics and geometries of boundaries (**document all boundaries and edges at site: why important and how can they be utilized?**)

Compatible and incompatible borders and components, timing and shaping events

Flow patterns, open and over landscape and objects, spirals, mnemonics, dimensions and potentials

Accretion and expulsion, branching pattern effects, conduits

Orders of magnitude in branches, scale of size

Orders, dimensions and classification of events, time and relativity model

Tessellation of events in the world we live, pattern application (**give examples of nesting of functions at site**)

Events, toroidal phenomena and the five senses

Memory and pattern recognition, companion planting and guilds (**identify five guilds on the site**)

Traditional use of cultural patterns in society and in the present world society

Designers checklist

Review Keypoints & questions

2-4 Handouts

Most Recommended Books:

- Alexander, Christopher, *A Pattern Language*, Oxford University Press, London, 1977.
- Coates, Callum, *Living Energies*, Gateway Books, Bath UK, 1996.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Thompson, D'arcy, *On Growth and Form*, Cambridge University Press, 1952.

-Climatic factors

Learning objectives: In this unit students will learn to forecast the weather through the use of their senses, understand cloud forms, the movement of weather fronts, the affect that different weather systems have on crops, heating and cooling in homes, microclimates, the differences in latitude and altitude on weather patterns, the uses and abuses of modern technology in weather forecasting, and how weather patterns fit into and affect the entire web of life on earth.

Defining pattern of local climate – seasonal effects & planting seasons (frost dates etc)

The humid, temperate, cold, arid, continental climates plus variations.
Global weather patterns, the engines of atmosphere.
Humid, arid and minor landscape profiles and orthographic affects.
Latitude and altitude.
Precipitation, radiation and wind.
References.
Designers checklist.

(Students will document weather patterns by using their senses at the site: cloud forms and movements, temperature, humidity, microclimate in the landscape, etc.)

2-4 Handouts

Most Recommended Books:

- Klocek, Dennis, *Weather and Cosmos*, Rudolf Steiner College Publications, Fair Oaks, Ca., 1990.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Schaefer and Day, *Atmosphere: Peterson Field Guide*, Houghton Mifflin Company, Boston, 1980.

-Trees and their energy transactions

Learning objectives: In this unit tudents will learn to identify trees and plants and come to an understanding of their significance in the landscape. They will begin to delineate the uses of plants and trees for food, medicine and utility. They will observe trees in their natural environment, and through observation, find methods to employ them as windbreaks, shelterbelts, habitat for animals, and companions for other plants that contribute to health and increased yields. Guilds, basic biology, basic botany, affects of weather on vegetation, interactions with animals, and the processes of various habitats and ecosystems will be discussed.

(Identify ten local trees and their uses: do they fit into the site plan?)

Definition of forest and the biomass of a tree.
Temperature, wind, total precipitation, snow and melt water effect
Root, mineral and rain interactions
Implications for design **(on the site how will trees govern the elements and are the trees that exist there beneficial to this particular site? Identify and research)**
The many types of forest **(what is the forest type on the site? Walk around, identify, climb, feel the soil beneath the trees, etc.)**
Establishing forest

Maintaining extending and enhancing forest
Establishing a nursery seed collection and in ground plant stock.
Summary

2-4 Handouts

Most Recommended Books:

- Barnes, Burton, *Forest Ecology*, John Wiley and Sons, NYC, 1980.
- Coates, Callum, *Living Energies*, Gateway Books, Bath UK, 1996.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Odum, Eugene, *Fundamentals of Ecology*, W.B. Saunders, Toronto, 1971.
- Petrides, *Trees and Shrubs: Peterson Field Guide*, Houghton Mifflin Company, Boston, 1987.

-Water

Learning objectives: In this unit students will learn how to read slope and how water moves by gravity. You will discuss what the hydrological cycle is and its importance in the great web of life. You will learn how to capture water with dams and swales, how to recharge groundwater systems, how to move earth in order to construct earthworks such as ponds, lakes and dams, how to identify the keyline in a landscape, how to assess and construct wetlands for water purification, what kind of vegetation helps to purify water, what to plant in and near swales, ponds, and lakes, how to utilize gray water in orchards and fields, and when the use of septic, leach fields and wells are appropriate. Most of all you will learn that all water used in the landscape and for personal use can be purified and recycled for further use. Water rights and usage are becoming a major issue in the world today: what are these current issues?

Find a spot on each course site to have students build a 2 foot mound of dirt, water it down on first day (observing water flow) and then craft the mound with ponds, swales and other earth moving features a couple of days later when pile dries. Turn hose back on project following the digging of features to observe water flow.

Chemical & structural properties of water
Regional interventions and the water cycle
Water harvesting earthworks for conservation and storage (**create swales or an impoundment on the mound and run a hose into it and see if it holds up**)
Rain water harvesting, biological water cleaning systems, irrigation and gravity designs
Water reduction in sewage systems
Water in design (**observe the site and make recommend water design based on observations of slope, obstacles, buildings, etc: be the water engineer**)
Designers check list.

2-4 Handouts

Most Recommended Books:

- Campbell, Stu, *Home Water Supply*, Storey Books, North Adams, MA, 1983.
- Coates, Callum, *Living Energies*, Gateway Books, Bath UK, 1996.
- Ludwig, Art, *Water Storage*, Oasis Design, Santa Barbara, Ca, 2005.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Yeomans, P.A, *Water for Every Farm*, Second Back Row Press, Leura, NSW, Australia, 1981.

-Soils

Learning objectives: In this unit students will experience the intricacies of soil, first hand, through lectures, hands-on tests, sensory exploration, work in the garden, and observation of plants and their growing habits in the landscape. You will use the soil at your site for study. From each segment of the outline you will document what you see in the soil at your site.

-Have students retrieve 3 varied soil samples, as diverse as possible.

a. Discuss properties as dry samples

b. Jar method of investigating soil make-up

c. Soil PH test and what it indicates. Pros and cons of each condition

-MP will obtain a soil analysis for each course site. Instructors spend 30 minutes discussing what the results mean.

Soils direct link to health

Traditional methods of investigating soils

The pH, organic matter content and primary nutrients

Soil pores and crumb structure importance

Soil structure and its relationship to life elements, water and base rocks

Legumes as nitrogen fixers and the phosphate accumulating plants

Plants and biological elements as deficiency indicators and mineral accumulators (**identify five plants on the site: what are they telling us about the soil?**)

Difficult soils

Composting as an easily understood art form of humus creation

Seed pelleting, soil erosion and rehabilitation

Establishing a worm farm

Soils in house foundations

Designing for catastrophe, fire, flood, drought, earthquake, landslide and tsunami

Designers check list

2-4 Handouts

Most Recommended Books:

-Anderson, Arden, *Science in Agriculture*, Acres USA, Kansas City, Missouri, 1992

-Brady, Nyle, *The Nature and Classification of Soils*, Prentice Hall, Upper Saddle River, NJ, 1996. Carbondale, Illinois, 1977.

-Fukuoka, Masanobu, *The Natural Way of Farming*, Bookventure, Madras, India, 1985.

-Gershunney, Grace, *Soul of the Soil*, agAccess, Davis, Ca., 1995.

-Steiner, Rudolf, *Agriculture*, Biodynamic Agricultural Association, London, 1984.

-Storl, Wolf D., *Culture and Horticulture*, Bio-Dynamic Literature, Wyoming, 1979.

-Tompkins, Peter and Bird, Christopher, *Secrets of the Soil*, Harper and Row Publishers, NYC, 1989.

-Walters, Charles and Fenzau, C.J., *Eco-Farm*, Acres USA, Kansas City, Missouri, 1996.

-Earthworks and earth resources

Learning Objectives: In this unit you will learn how to survey the land prior to earth moving by measuring slope and area, operate a front loader and back hoe (if available on site), what it takes to shape dams, ponds, swales, terraces, foundations for houses, and other earth constructs. You will explore the differences of a diversity of soils and what it takes to shape them.

(Cut out several different shaped pieces of wood and use them to push, sculpt and scoop earth)

Earthwork design concept planning

Planting after earthworks

Types of earthworks, earth constructions and earth resources

Understanding the surveying of basic levels and slope measurement

Using a farmers level, dumpy level, A-frame and water levels (***build an A-frame and use it, use a bunyip level, use various measuring tools***)

Technique of building a dam, swales, earth banks, terraces, roads and drains

Using the right machine for the job

Presentation of Design Exercise for the Course

Design exercise presented to students on a real piece of land with realistic design brief for the local area.

Teacher takes on the role as the land owner (if land owner not available)

Students are split up into working groups, each with different design briefs.

Last session of the day is student group design and after hours in the evening if desired.

2-4 Handouts

Most Recommended Books:

-Bradshaw, A.D. and Chadwick, M.J., *The Restoration of Land*, University of California Press, 1980.

-Hunt, Donnell, *Farm Power and Machinery Management*, Iowa State Uni. Press, Ames, Iowa, 1995.

-Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.

-Various Climatic Factors

Learning Objectives: In this unit you will apply all that they have learned in the previous units and develop ideas for the three broad climatic zone designs. We will research and discuss the contrast and similarities between climatic zones, and see how ideas can be shared between them and what would work specific to a particular climate. We will also discuss how the basic guidelines of Permaculture are a unified model, and can be applied to any predominant climate.

(Have an abundance of materials: popsicle sticks, playing cards, tin cans, boxes, etc to construct houses in the environment of all three climatic zones, their orientation to the sun, the movement of wind through house, etc)

What can we do to retrofit this building we are in? What are the soils like around the stem wall and foundation? Does this building enhance the community dynamics of the place or does it clash with it? Etc.

The humid tropics

Climate types, tropical soils and earth-shaping

House design and home garden

Integrated land management, Elements of a village complex in the tropics

Evolving a polyculture, themes on a palm dominant polyculture

Pioneering, animal tractor systems and grassland and rangeland management

Humid tropical coast stabilisation and shelterbelts

Low islands and coral cay strategies

Designers check list

Dryland strategies

Precipitation, temperature, soils

Landscape features in deserts, harvesting water in arid lands

The desert house, the desert garden, garden irrigation systems

Desert settlement and broad strategies

Plant themes for drylands, desertification and the salting of soils

Cold montane deserts

Designers checklist

Humid cool to cold climates

Characteristics of a humid cool climate, soils, landform and water conservation
Settlement and house design, the home garden, berry fruits, glasshouse growing
Orchards, farm forestry, free range forage systems, the lawn
Grasslands, rangelands, cold climates, wildfire
Designers check list

2-4 Handouts

Most Recommended Books:

- Altieri, Miguel, *Agroecology*, Harper Collins, Boulder, Co., 1989.
- Lyle, John, *Design for Human Ecosystems*, Island Press, Washington DC, 1999.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.

-Aquaculture

Learning objectives: In this unit students will explore aquaculture as a viable and healthy food producing option to only land-based crop production. Aquaculture out-produces agriculture. They will learn that aquaculture is not limited to fish, crayfish, muscles, etc., but that pond and river edges offer more yield near the aquatic environment. Ducks and geese integrate with the food web of the aquatic habitat. The economic potential of an aquaculture farming practice will be discussed. All study and implementation is based on location of the site and local weather patterns.

The case for aquaculture
History and cultural variations
Implementing an aquaculture design, species selection and yield
Aquaculture as part of design and food supply
Aquaculture plant and animal species
Farming invertebrates for fish food
Appropriate techniques, channel, canal and chinampa (***Dig a chinampa and explain how it works***)
Polyculture traditional and new
Designers check list.

2-4 Handouts

Most Recommended Books:

- Hutchinson, Laurence, *Ecological Aquaculture*, Permanent Publications, Hampshire, Eng., 2005.
- Matson, Tim, *Earth Ponds Sourcebook*, Countryman Press, Woodstock, Vermont, 1997.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Appropriate Technology Sourcebook*, Volunteers in Asia Publication, Stanford, California, 1993.

-The strategies of an alternative global nation

Learning Objectives: For discussion: Formal and Informal Economies: worker-owned enterprises with non-exploitative relationships, decentralized governance, recognizing ideal relationships between elements in the system and maximizing symbiotic relationships, building strong community, basic necessities (birthrights).

The invisibles structures
Alternative global nation. Right livelihood
Setting up a local permaculture group and working network
Community gardens, establishing city farms, urban strategies and land access
Lets, alternative money, bioregional organization, village development, ethical investment
Working in different cultures with sensitivity, effective aid

2-4 Handouts

List of 2-3 Most Recommended Books:

- Goldsmith, Edward, *The Way: An Ecological World-View*, Shambala, Boston, MA, 1992.
- Mollison, Bill, *Permaculture: A Designer's Manual*, Tagari Publications, Tyalgum Australia, 1988.
- Sarkar, P.R., *PROUT, The Master Unit, Ananda Marga, and the Collected Writings of Baba Anadamurti*.
- Schumacher, E.F., *Small is Beautiful: Economics as if the Earth Really Mattered*, Harper and Row, NYC, 1989.

-Practical Work on Design

Learning Objectives: Throughout the course we will be working in smaller groups on different aspects of a site specific design (For Ex: a waste management team, a renewable energy team, an agricultural team, etc.). There will be a short review of the basic ideas and areas already covered. Some assessment steps: 1) Observation assessment; 2) Slope; 3) Hydrology; 4) Vegetation; 5) Wildlife; 6) Agriculture; 7) Land layout; 8) Roads; 9) Water; 10) Energy; 11) Wastewater; 12) Walking paths; 12) Dams and lakes; 13) Telecommunications; 14) Create a final design: assessment, planning, bubble diagrams and sketching, timelines, budgets and expenses (labor, tools and materials). We will also look at how to draw the design on paper in a suitable format, with the proper drafting tools and/or design software.

-Closing

Permaculture as a vocation/avocation

- Diploma information
- Permaculture academy
- Certification and student intention affirmations
- Feedback opportunity on course materials/teaching/activities

Recommended Film/DVD/Videos

- Global Gardener
- Sepp Holzer – Terraces. Water
- Power of Community
- Fractals – The Colours of Infinity
- Others....