

Electronic lecture note

HRT 509 – Landscape Horticulture

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COURSE OUTLINE

Definition of landscaping.

Natural versus man made landscape.

Scope and historical sketches of landscaping.

Needs for landscaping: to enhance property beauty and value; to provide screening effect etc.

Institutional, private property, industrial, parks and gardens, roundabout and recreational areas.

Landscaping: gardens, sporting arena, stadia

Design principles, design practice, basic styles, preparing landscape plan

Landscape construction,

Hard landscaping, soft landscape,

Contract and contractual agreements.

Practical: Identification of tropical ornamental plants. Visit to places of interest, Plan reading and translation. Drawing and design production, design concepts. Field work-contour development. Topographic map production. How to prepare contract document

General introduction

Horticulture- science concerned with intensively cultured plant directly used by people for food, medicinal purposes or for aesthetic gratification (environmental beautification).

In summary it is a science that deals with cultivation of garden crops.

Branches: Pomology, Olericulture, Floriculture, landscape Horticulture,
Horticultural Engineering etc

An overview of landscape horticulture industry in Nigeria: prospects and problems.

Landscaping: The art and science of developing the outdoor environment using soft landscaping, e.g. ornamental plants, and hardscapes e.g. non-plant objects, components to serve the needs and desires of people. It serves both the aesthetic and functional purposes. The outdoor surroundings could be designed with natural or man-made components/materials/objects i.e it could be natural or artificial. Landscaping involves design, construction and maintenance of landscapes.

Landscape design/Garden design: Science and art of organizing and enriching outdoor space through the placement of plants and structures in agreeable and useful relationship with natural environment.

It involves the qualitative and functional arrangement and spacing of plants and non-plants garden features on a parcel of land set aside in the planning process that gives an overall pleasing effect.

Design essentially entails manner in which objects are artificially arranged in order to attain a particular objective, usually may be not always, a functional and a visibly pleasing arrangement. Designs are evaluated aesthetically with regards to their element of colours, texture, line and form by long established man made value judgment called design principles. A successful design is normally functional and beautiful.

Landscape design is more than just a cosmetic treatment to be applied to indifferent or insensitive architectural or engineering in order to soften the harsh edges or disguise an awkward layout.

It is to integrate structures in to the environment by reducing the visual intrusiveness, by repairing damage to the existing vegetation and more positively by providing a setting that is attractive and welcoming.

Landscape: Layout/arrangement of ground or land in scenery. It could be natural or artificial (man-made)

Natural versus man-made (artificial) landscaping

Natural landscape: A landscape that is unaffected by human activities. It may contain components that are living or non-living or both. Natural landscape remains intact if the living and non-living of the natural environment are free to move and change. Today no place on earth is unaffected by human activities. Thus landscape tends to vary in their degree of naturalness. Therefore, classification had been made into four types:

- a **natural** landscape is one that is unaffected by human activity
- a **sub-natural** landscape is one where if human activity was removed it would go back to a normal state
- a **semi-natural** landscape is one that has been drastically modified by human activity but has some natural elements left intact
- an **agricultural** landscape is one that has been totally altered and arranged by human activity - very little if any naturalness is left

Examples of natural landscape in Nigeria are; natural surrounding such as forest or desert, rocks (Olumo rock, Zuma rock), Erin Ijesa water falls, Ikogusi warm/cold spring, plateau in Jos, Mambila, bar beach, etc.

Artificial Landscape: The use of artificially made plants (synthetic or otherwise) for landscaping of outdoor environment. Nowadays, it is common to see large quantities of artificial plants (trees, palms, lawns) being used for landscaping. Though, it will not and cannot replace the natural plants in their effects and functions on the landscape, but could also add to the beauty of the environment. It has the advantage of low maintenance in terms of watering, fertilizer application, mowing incase of lawns and turfs, trimming/pruning and so on. Other items in artificial designs include the use of art works, e.g. sculpture (UNAAB Olumo model), concrete benches and tables, water bodies such as water fountains, artificial springs, etc.

Scope and historical sketches of landscaping

Scope: Landscape by its very nature encompasses all other specialist sections of Amenity horticulture in one form or the other. It includes the design, construction, maintenance and management of landscape features. Knowledge of floriculture, landscape architecture, and engineering are usually important.

History: Landscaping is an important sector which has expanded and still expanding in recent years in Nigeria. Despite this development, it is by no means comparable to what is obtainable in the developed countries in terms of development, quality, patronage and boom experienced in the landscape horticulture industry.

People have designed garden throughout the recorded history. Thousands years ago in Egypt and Babylon, there were planted architectural structures. The roots of renaissance garden extend back to the tradition of antiquity, especially those of ancient Rome. To self conscious revival of the idea of Vitruvius and Pliny, there was added the influence of Islamic world and medieval theory and practice. The use of water and fountains and organization of garden in to geometric quarters were part of wider inheritance.

In Nigeria, from the time immemorial, people consciously or unconsciously add physiographic and environmental characteristics to the land around them either for aesthetic gratification and or environmental enrichment and protection.

Traditionally, people keep garden and trees around their buildings. Though, the experience of the colonial era did little to influence creation and preservation of beauty in the surroundings as it was in Francophone countries.

Nevertheless, the inception of colonialism changed the trends of events as concerted effort were made to formally landscape some public buildings, government reservation areas (GRAs), institutions of higher learning, and sport fields which marked the beginning of organized/formal landscaping in Nigeria. Missionaries (Christian) also established plants in churches and schools. Some individual copied this idea and planted some ornamental plants in their surroundings.

Nowadays, landscaping business is fashionable and there is influx of all sorts of people in to the profession, having seen it as an avenue to make quick money. There is generally, limited concern for landscape planning and management in Nigeria, most importantly

from government with the exception of few state governments, who recently seem to brace up to the challenges of creating a beautiful and welcoming environment.

Needs for landscaping:

Basically, if human beings had never altered the natural world, there would be no need for designers. Nature is such a perfect designer that left unchanged by human beings, the earth's beauty and natural system would never have require improvement. This idea is however not realistic in the modern world.

Therefore, some of the reasons why landscaping is important are;

1. Aesthetic/ Beautification of environment which is the primary purpose of landscaping
2. Engineering purpose: e.g. Environmental control and protection of structures against environmental hazards i.e. rain storms, wind breaks, shade trees for guide against sun glares etc.
3. Architectural purpose: e.g. re-integration of structures in to the natural environment. Landscaping compliment rather than competing with the architectural features of structures thereby making enhancing their outlook.
4. Biological purpose: e.g. improves the micro-climate (environment), absorbs dust, noise, pollutants and assist in air purification by consuming CO₂ and releasing O₂.
5. Ecological purpose: e.g. some ornamental plants can be used to solve ecological problems such as flooding, to control erosion and absorb chemical from soil (oil spilage)

6. Economic purpose: e.g. creation of job opportunities, add value to property, creates wealth for plant growers and government (taxes, foreign exchange), beautiful environment also attract tourists and investors.

7. Social purpose: e.g. landscaped areas are useful as recreation and relaxation venues (parks), sporting arenas (polo, football fields), and symbols of affluence/wealth.

8. Nutritional/Medicinal purpose: e.g. some plants used primarily for landscaping could also be used for food (fruits and vegetables) and medicines, plants have therapeutic effect on patient etc.

1. Private property/residential landscaping: Landscaping of personal residential properties like a flat, bungalow, duplex, estate etc. Usually, plants of different good qualities are used as much as possible for the enjoyment of owner(s). It is important to landscape to the taste of the clients even if expensive materials will be used. The well design private home landscape is planned to meet the needs and desires of the family. It is concern with establishing a functional and aesthetic relationship between building and site to the extent that the house and surroundings area are treated as a single home unit. This involves consideration of the distribution of space, maintenance and for most people expense. Most private or residential buildings need at least three general areas;

(a). For public access- usually it is the front yard portion of the house that is on view to the public, the passerby and the welcomed guests. It creates the setting and tone of the home and should be large enough to set off the house from the street to ensure safe access for automobile.

(b). For service and work: The service area accommodates places for garbage and trash disposal, clothes drying, vegetable gardens, dog houses, lawn mowers, storage facilities etc

(c). For family living: The most functional outdoor family living area should be an extension of the dwelling. This implies accessibility from the inside living area. The area should be leveled and sufficiently screened and sheltered to assure privacy and comfort. All elements of this area should be planned to contribute to a total effect of pleasant and beautiful living space. Prominent in the outdoor living area is the patio, a paved area attached to the house with or without structural ceiling. The relative size of the outdoor living area is matter of need, preference and availability of space.

There is no need for plant nursery- it is small in scope and very expensive to keep a personal nursery

No green or glass houses is required

There is only one garden for family members and their friends

2. Industrial landscaping: It involves the establishment of plants and hardscapes within the industrial estate/area e.g Agbara industrial estate, Nigeria Breweries Ltd, Portland/Lafage cement company, etc. Most areas are planted to grasses, trees and hedges along the walkways. It is not necessary to use exotic or expensive items compared to private property landscapes. When landscaping for factories/industrial centres, study kind of activities in each section e.g manufacturing area with many peoples, vehicles and materials-grassing the whole area dotted with spot planting will be appropriate. Near

administrative block, use beautiful materials because it is the focus and should be at its best. Inside the offices; a number of indoor plants may be introduced.

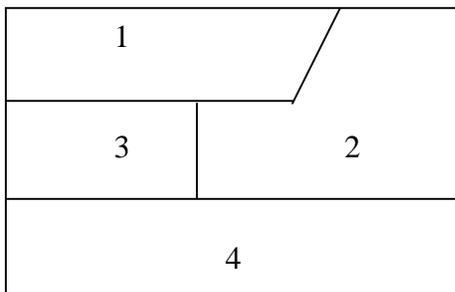
There may be need to have a plant nursery within the industrial estate, particularly for big industrial estate. No green or glass house is required. It has at least two gardens depending on the size

Though, hotels can also be regarded as industrial landscaping because it is not meant for a single family, but for the general public and for commercial purpose. However, in actual execution of the project it treated like private property because of requirement for high taste.

3. Institutional landscaping: Landscaping that involves all sorts of institutions- universities, colleges, polytechnics, hospitals, research institutes, barracks etc. Usually it is meant for all categories of users, i.e. general public of all age category- children, adolescents, adults, women, men, students, lecturers, non-academic staff, scientist etc. Institutional landscaping must be different from others because it is not only for recreation, picnic but also for instructional purpose (educational). They are often expected to be formal, even monumental in their design and setting as compared with most commercial building. The landscape should be spacious, dignified and distinctive. There should be a plant nursery, particularly for replacement of dead plants and to plant new areas. Presence of green and glass houses is also important. There are many gardens and usually larger.

4. Recreational landscaping: It involves landscaping recreational arenas (polo ground, parks and gardens, football pitches, game villages etc) for adults and children. It has special inclusions such as restaurant, water fountains, focal plants, green lawns and other areas for social like picnic, marriages, honey moon, film shooting. Nowadays, ICT and photocopy centre have been added.

Using the ‘Indoor room concept’ to describe the Outdoor



- 1- Public area
- 2- General living room
- 3- Service area
- 4- Private living room

Walls- hedges, avenue trees,
 Ceilings- shade trees, canopies, etc.
 Floors- lawns, foundation plants, concrete floors and walk ways, roads with interlocking blocks or asphalt.

i.) Use areas

- 1. Public area –** usually the front part of the property accessibility to visitors
- 2. General living room –** an area of the home that joins the public area, service room and private room
- 3. Service area –** accessible to only the occupants
- 4. Private living room –** an area for rest and occupies the rear of the property and not accessible to outsiders

ii.) Components of the outdoor room:

a. Walls - defines the limit and shapes of the out door room, direct traffic through the landscape (hedges, avenue trees), provides full or partial privacy (), provide security (thorny plants e.g. boungavalia spp.), etc.

b. Ceilings – defines the upper limit of the outdoor room, provide full or partial shade, provide privacy from overhead viewers, etc.

c. Floors – defines the base line of the outdoor room, absorbs shock or impact of traffic, e.g. turfs / lawn, paving, ground covers,

Principles of landscape design

The goal in developing a landscape plan is to design a plan that will achieve unity and harmony. The principles of landscape design are the building blocks used by designers to create beautiful and functional landscapes. Landscape design principles are the same for all types of landscapes. They are in many different ways, depending on the site, the clients' wishes, and designer's knowledge and preferences. Similar to elements of art, these principles represent the primary concert that influence landscape design. Design principles are not rules that require precise adherence, but instead reflect a framework of universal concepts that prove effective in creating designs.

Therefore the following principles should be considered in designing the plan;

1. Simplicity: Regardless of the scale of a landscape, simplicity should be an overriding design consideration. This is obtained by repeating the plantings. A few well-arranged forms, colours or textures should be used. Too many different things in a small area produces a restless quality which will leave the onlooker dissatisfied. Simplicity in a landscape can be created both physically and visually. Physical simplicity refers to a design in which the actual shapes are simple e.g house dominate a residential landscape design, use simple bold rectilinear lines that mimic the house or a strong audacious curves rather than thin, wiggly bedlines that resemble snake lying in the grass. Visual simplicity can be achieved when plants are grouped or massed together.

2. Order: Order can be achieved by using consistent design theme such as formal, informal or structured informality. Grouping plants and hardscapes so that there are physical connections between the elements will enhance order and create a cohesive whole. Order can be further reinforced by grouping plants together in masses, rather than scattering individual plants around the landscape.

3. Repetition: There is need for reappearance of attractive materials in several locations in the landscape. It results in a sense of unity between the different plant species that make up the design. Too much repetition leads to boredom while too little leads to visual chaos. Repeat one or more basic art element (form, colour, texture, size) e.g planting of red flowers at all entrances to the house.

4. Rhythm and line: It addresses the factors of time and movement within a landscape. Landscapes are seldom experienced in an instant, but rather through time as a person explores the space. Rhythm in a landscape may be visual or physical, and it can be observed in both vertical or horizontal planes of a design. For example, vertical visual rhythm is gradual progression of plants from short to tall. Horizontal visual rhythm is often generated for bedlines or hardscapes. How a person moves through the landscape and physically interacts with it can be determined, in part, by the design rhythm e.g pathway width and route, dimensions, spacing of interlocking blocks, location of seating or resting elements.

5. Unity: It is the principle that creates link between the plants, hardscapes and house. It creates a sense of interconnectedness within the design composition. A successful landscape design ties the house and landscape together and creates an outdoor living

space that is an extension of the house. Unity can be reinforced by using consistent bedlines, single ground cover, massing plants together and repeating these masses throughout the landscape.

6. Balance: The design should include a focal point or centre of interest around which the landscape plants, structures, and open spaces are grouped or balanced. The arrangement of plants and other objects should be in a sequence leading to or away from a focal point. The front entrance of the home is usually the focal point. A sense of balance is created by designing a real or imaginary point and by using mass, colour, line or texture in equal quantities on each side of the point. The types of balance in landscapes are symmetrical, asymmetrical and radial. Symmetrical is common in formal landscapes. This landscape has an obvious central axis, and everything on one side of the axis is mirrored on the other side. Asymmetrical balance combines different objects on each side of a discrete axis or balance point, resulting in a similar visual mass on both sides of the axis or point. The bedlines in asymmetrical design tend to be curvilinear, and the overall feel tends to be informal than a symmetrically balanced design. Radial balance is created by equally spacing objects around a centre point, creating a strong focus in the middle of the pattern. It can be used effectively in patios and paved areas or in large areas that integrate plantings and hardscapes.

7. Proportion and scale: refers to size relationship between the different components within the landscape. It could be relative or absolute. Relative scale is the relation of one part of the design to the others. The house is often the dominant element of a residential design, and it requires that at least some elements of the design be sufficiently sized, e.g.

height of building may influence size of plants. Absolute scale is the relation of a particular design element to human. Plant materials help to define size relationship within a landscape. The major relationships that involve plant materials are; plants to buildings, plants to other plants and plants to people. Because plants are living and dynamic entities, these proportional relationships will change as the landscape mature and even season to season if the plants are deciduous or herbaceous. To attain correct proportion, the landscape design should be based on mature height and spread of the plant.

8. Emphasis: focal points draw the eye to specific landscape locations when a person is viewing the landscape as a whole. Emphasis on specific areas and create a contrast between memorable, vivid or exciting landscape elements and the rest of the landscape. A focal point may be a specimen plant, garden accessory or water feature. It captures attention by its unusual line, shape texture or colour. Each major area in a landscape should have one focal point, multiple point is acceptable if the area is large.

Preparing/Developing/Creating the landscape plan

The development of landscape plan be it private, public or institutional merges the arrangement of plants and other materials with the graphic skills necessary to symbolize them. A well developed landscape plan provides an orderly means of landscaping a site and prevents waste of labour, money and possibly plants. It requires that the principles of design be applied to an entire property, not just sections and that the final design possess a unity which integrates all use areas into a total plan. The time spent in analyzing a site and developing the plan is a good investment that can prevent frustration, save time and provide the appearance desired. The preparation of landscape plans requires a lot of

work, considerable thought and planning. The following procedures are suggested as a guide to initial design and planning of garden and landscape plan.

A. The first step in the development of a landscape plan is the site analysis which is divided in to the on-site and off-site analysis. One or more visits to the site may be necessary to analyze or evaluate the site.

On-site analysis: Landscape designer should draw the site features and the proposed building plan on graph paper. Normally/usually, a prepared chart/checklist should be completed on the site. At least two peoples are required to carry out site analysis. A number of factors or condition should be considered in making site evaluation and should be accurate and in detail. Highlights of some of these factors are;

1. Climate of the site: Information on amount and distribution of rainfall/moisture, quantity and direction of sun (sun glares) and wind as well as shade available to the different areas of the site very important. These factors will influence selection and arrangement of plants.
2. Soil conditions. A soil sample should be taken and soil tests conducted. Soil type, depth, fertility, pH, structure and drainage should be noted. The direction and percent of slope is needed in the development of the site. It may be necessary to run contour lines on a steep slope. Contour lines should be included in the plans.
3. Location: It will to a large extent determine what form the landscape takes. In the tropics a great many different types of conditions exists, from forest to jungle, from sea levels to high mountains; and types of plants and planting patterns used will be controlled by this existing environment. When deciding what plants to use, look at existing plantings in similar locations, then select those that will best suit your purpose.

4. Existing structures: Buildings, walks, fences and other structures as well as their exposure to the prevailing wind and orientation of the sun should be noted in the site analysis sheet. The main purpose of landscaping round a building is to blend the building in to its surroundings and to do this effectively, a balance has to be kept between the building and the plantings round it. A group of small trees in front of a large building can look out of place and a large tree planted very close to a small property will also be wrong. As a general rule, bigger building will call for larger subjects like trees and tall palms and for small house use small trees or shrubs. Also not all building s are attractive, planting may be used to hide sections of a building, to break or soften hard line, or to conceal some functional or untidy detail. The shape of the building will often determine the form of the landscape. A very formal house layout will require some certain formal features in the garden whereas a modern informal house would saddest a more natural layout.

5. Existing vegetations: A record of the size, age condition and species of the trees and shrubs should be taken. In case of thick vegetation, proper clearing is very important which could be expensive and should be adequately built in to the cost analysis for the project.

6. Rock outcropping- The size, type and location be recorded. This area can be developed in to a spot of beauty i.e rock garden within the landscape.

7. Utilities: It is also important to ensure that the planting does not interfere with installations necessary to the operations of the building. Therefore all utility lines, be it underground or overhead should be plotted on the map. This information will prevent problems trees branches and roots getting in to draining pipes and electric lines.

8. Presence of water bodies- Where available wet areas, overflows, lakes, rivers and drainage should be located on the plan to adequately utilize their occurrence within the environment.

9. Dimension – It is important to take accurate measurement of the areas requiring the attention of landscapers to quantify the hardscapes and plants required for the job for appropriate cost estimation.

Off site analysis:

The purpose of this part of site analysis is to consider the site in relation to distant views and neighbouring areas which has a distinct influence upon the needs of the site. Features like trees, adjoining backyard, mountains, valleys, bodies of water e.g lakes, sea etc, forests, towns, cities etc located within the adjoining site becomes part of the site landscape. If a good view is spoiled by an untidy building, plant to hide the building, not the whole view. If the outlook from a property is not very good, a view can be created within the landscape by suitable screen planting on the boundary and attractive planting inside this screen-planting. Off-site factors that may present problems in landscaping are pedestrian traffic, noise, dust, bright lights, bill board, utility lines, roads, and neighbouring properties. It may be desirable to use screens to eliminate unfavourable factors.

B. Analysis of clients/family needs:

After the site has been analysed, the next step is to evaluate the family or clients needs. In designing a property, private or commercial or institutional the owner will of the property will have certain requirements. The needs of each client are different and each client has personality of its own. Clients should be asked to list facilities they prefer in their

environment. The size (number) and ages of users will influence landscape design. It is advisable that the design option chosen be flexible to accommodate further development in the future.

C. Match the client needs and site capabilities as closely as possible. There are basic features of the landscape and must be positioned carefully. It is not uncommon to get two conflicting interests, but through proper plant selection and professional competency both interests can be partially if not fully satisfied

D. Area layout plan: There are three principal areas that are usually considered in landscape plans. These are

i The public area which generally is the area in front of the house. However it could be on the side of the house if this is the approach owner wishes the visitors to use.

ii The service area is the area in which trash cans, cloth lines, dog runs, and work areas are located. It is often screened from view.

iii The private: This is the area normally used by the family for outdoor entertainment and lawn grasses. It is usually located at the rear of the house, but it may be on the side. Screening may be used to provide privacy in the area. The vegetable and flower garden may be located in this area.

After these three areas have been designated on the tracing paper, rough sketches of the organization of these areas should be drawn.

E. Select a scale that allows the site to be reproduced on paper, including lot, building and existing structures/features.

F. Assign use areas to appropriate region of the property. Layout the areas with wide angles to avoid creation of narrow, tight and impractically shaped spaces.

G. Select focal points and locate them within the used areas

H. Shape each use areas in a way that directs attention to the focal point and relates it to adjoining use areas.

L. Selection criteria for plants: Selecting the best plants for a given position require a knowledge of the plant materials available and the types of growing conditions they prefer. A plant can be beautiful in its natural environment can be very ragged out of it, so it is important to give plants right growing conditions. Planting is needed to give privacy, cut down wind, give protection from sun, give pleasant effects etc.

1. Ability to fill the role assigned it in the design
2. Ability to survive the growing conditions of the site
3. Availability and affordability by clients
4. Plant size at maturity
5. Flowering qualities
6. Foliage and tree back colour
7. Presence or absence of thorns
8. Plant rate of growth and length of life
9. Deciduous or evergreen
10. Susceptibility to pests and diseases
11. Frequency of pruning required
12. Soil preference
13. Able to withstand severe trimming/pruning eg hedge plants
14. Attractive appearance

15. Ability to keep out intruders, including animals

16. etc

Selection criteria for pavings:

1. Ability to fill the role assigned it in the design
2. Availability and affordability by clients
3. Durability
4. Maintenance requirements

M. Review of soft and hard landscaping.

Soft landscaping: refers to the plant component of landscaping. It entails the use of plants of all categories (palms, trees, shrubs, grasses, herbaceous plants etc) that are natural in a landscape. The plantings of especially indigenous plant species ensure integration of structures in to the natural environment thus appearing natural in nature, among other many uses of plants in our surroundings. Both soft and hard components are employed to realize a beautiful and functional landscape.

Hard landscaping: The use of any non-plant materials in the development of a landscape. Examples include walkways, driveways, patio, decks, walls, ponds, fences, pergolas, steps, landscape lightings, water fountains, furniture, containers for potted plants etc. These features, individually and in combination, make up the ground, vertical, and overhead planes within a landscape and define outdoor living spaces. Hardscapes should be used to compliment the plants component to meet a client's need.

Landscape Project Cost Estimation

Accurate cost estimation for landscape projects is central to the success of the industry. Over or under estimation of cost of the materials required for the job must be avoided. It is usually done after accurate measurement and examination of the site, pricing all materials required for a successful project and a reasonable profit added. It must be prepared by the most experienced person to ensure precision since it is one of the veritable tools for contract bidding.

Methods

- Superficial/Simplest
- Bay system/method
- Grouped quantity method
- Scheduled method
- Accurate estimation/ Bill of quantity

Generally things to cost include;

- Labour
- Tools
- Transportation
- Ornamental plants
- Topsoil/ Manure
- Professional charges
- Contingency
- Maintenance cost before project delivery
- Etc

Studio Works:

- Preparing Private/ residential, institutional and industrial landscape design/plan
- Preparing contract document.

Field trips to relevant sites within the campus/Abeokuta city .