

**UNIVERSITY DEPARTMENTS**  
**ANNA UNIVERSITY, CHENNAI- 600 025**  
**REGULATIONS – 2013**

**M. ARCH (LANDSCAPE ARCHITECTURE) – FULL TIME**  
**I TO IV SEMESTERS OF CURRICULA AND SYLLABI**

| S. NO               | COURSE CODE | COURSE NAME                             | L         | T | P/S | C |
|---------------------|-------------|---|-----------|---|-----|---|
| <b>SEMESTER I</b>   |             |   |           |   |     |   |
| 1.                  | LN8101      | Geology and Soils                       | 3         | 0 | 0   | 3 |
| 2.                  | LN8102      | Hydrology and Micro Climate             | 3         | 0 | 0   | 3 |
| 3.                  | LN8103      | Planting And Horticultural Practices    | 3         | 0 | 0   | 3 |
| 4.                  | LN8104      | Site planning and Detailing             | 1         | 0 | 4   | 3 |
| 5.                  | LN8152      | Traditional and Contemporary Landscapes | 3         | 0 | 0   | 3 |
| 6.                  | LN8153      | Urban Landscape Design                  | 3         | 0 | 0   | 3 |
| <b>TOTAL</b>        |             |   | <b>18</b> |   |     |   |
| <b>SEMESTER II</b>  |             |   |           |   |     |   |
| 7.                  | LN8201      | Landscape Construction                  | 2         | 0 | 4   | 4 |
| 8.                  | LN8202      | Landscape Design Studio I               | 0         | 0 | 12  | 6 |
| 9.                  | LN8203      | Planting Design                         | 3         | 0 | 0   | 3 |
| 10.                 | LN8251      | Landscape Ecology and Planning          | 3         | 0 | 0   | 3 |
| 11.                 |             | Elective I                              | *         | * | *   | 3 |
| 12.                 |             | Elective II                             | *         | * | *   | 3 |
| <b>TOTAL</b>        |             |   | <b>22</b> |   |     |   |
| <b>SEMESTER III</b> |             |   |           |   |     |   |
| 13.                 | LN8301      | Advanced Landscape Design Studio II     | 0         | 0 | 12  | 6 |
| 14.                 | LN8302      | Dissertation                            | 0         | 0 | 6   | 3 |
| 15.                 | LN8303      | Environmental Legislation and EIA       | 3         | 0 | 0   | 3 |
| 16.                 | AA8351      | Research Methodologies in Architecture  | 3         | 0 | 0   | 3 |
| 17.                 |             | Elective III                            | *         | * | *   | 3 |
| 18.                 |             | Elective IV                             | *         | * | *   | 3 |
| <b>TOTAL</b>        |             |   | <b>21</b> |   |     |   |

| <b>SEMESTER IV</b>  |        |  |                    |          |                                 |          |                   |
|---|--------|--|--------------------|----------|---------------------------------|----------|-------------------|
| 19.   | LN8401 | Professional Practice of Landscape Architecture                  | 3                  | 0        | 0                               | 3        |                   |
| 20.   | LN8411 | Thesis   | 0                  | 0        | 22                              | 11       |                   |
| <b>TOTAL</b>  |        |  | <b>14</b>          |          |                                 |          |                   |
| <b>Total no of credits required for the award of the degree</b> |        |  | <b>75</b>          |          |                                 |          |                   |
| <b>List of Electives- M. Arch (Landscape Architecture)</b>      |        |  | <b>L</b>           | <b>T</b> | <b>P/S</b>                      | <b>C</b> |                   |
| 21.   | LN8001 | Application of GIS in Landscape Design                           | 3                  | 0        | 0                               | 3        |                   |
| 22.   | LN8002 | Computer Applications And Management Information Systems         | 3                  | 0        | 0                               | 3        |                   |
| 23.   | LN8003 | Landscape Management   | 3                  | 0        | 0                               | 3        |                   |
| 24.   | AA8071 | GIS Modeling in Urban Planning                                   | 3                  | 0        | 0                               | 3        |                   |
| 25.   | AA8151 | Contemporary Processes in Architectural Design I                 | 3                  | 0        | 0                               | 3        |                   |
| 26.   | DG8151 | Architecture and Critical Theory                                 | 3                  | 0        | 0                               | 3        |                   |
| 27.   | DG8451 | Web Design and Portfolio Production                              | 0                  | 0        | 6                               | 3        |                   |
| 28.   | LN8071 | Sustainability and Energy Conservation in Landscape Architecture | 3                  | 0        | 0                               | 3        |                   |
| <b>L- Lecture</b>   |        |  | <b>T- Tutorial</b> |          | <b>P- Practical / S- Studio</b> |          | <b>C- Credits</b> |

PROGRESS THROUGH KNOWLEDGE

**UNIVERSITY DEPARTMENTS**  
**ANNA UNIVERSITY, CHENNAI- 600 025**  
**REGULATIONS - 2013**

**M. ARCH (LANDSCAPE ARCHITECTURE) – PART TIME- DAY TIME**  
**I TO VI SEMESTERS OF CURRICULA AND SYLLABI**

| S. NO.              | COURSE CODE | COURSE NAME                             | L         | T | P/S | C |
|---------------------|-------------|---|-----------|---|-----|---|
| <b>SEMESTER I</b>   |             |   |           |   |     |   |
| 1.                  | LN8103      | Planting and Horticultural Practices    | 3         | 0 | 0   | 3 |
| 2.                  | LN8101      | Geology and Soils                       | 3         | 0 | 0   | 3 |
| 3.                  | LN8153      | Urban Landscape Design                  | 3         | 0 | 0   | 3 |
| 4.                  | LN8104      | Site Planning and Detailing             | 1         | 0 | 4   | 3 |
| <b>TOTAL</b>        |             |   | <b>12</b> |   |     |   |
| <b>SEMESTER II</b>  |             |   |           |   |     |   |
| 5.                  | LN8203      | Planting Design                         | 3         | 0 | 0   | 3 |
| 6.                  | LN8251      | Landscape Ecology and Planning          | 3         | 0 | 0   | 3 |
| 7.                  |             | Elective I                              | *         | * | *   | 3 |
| 8.                  | LN8201      | Landscape Construction                  | 2         | 0 | 4   | 4 |
| <b>TOTAL</b>        |             |   | <b>13</b> |   |     |   |
| <b>SEMESTER III</b> |             |   |           |   |     |   |
| 9.                  | LN8102      | Hydrology and Micro Climate             | 3         | 0 | 0   | 3 |
| 10.                 | AA8351      | Research Methodologies in Architecture  | 3         | 0 | 0   | 3 |
| 11.                 | LN8152      | Traditional and Contemporary Landscapes | 3         | 0 | 0   | 3 |
| 12.                 |             | Elective II                             | *         | * | *   | 3 |
| <b>TOTAL</b>        |             |   | <b>12</b> |   |     |   |
| <b>SEMESTER IV</b>  |             |   |           |   |     |   |
| 13.                 |             | Elective III                            | *         | * | *   | 3 |
| 14.                 |             | Elective IV                             | *         | * | *   | 3 |
| 15.                 | LN8202      | Landscape Design Studio I               | 0         | 0 | 12  | 6 |
| <b>TOTAL</b>        |             |   | <b>12</b> |   |     |   |

*Attested*

*Sobhan*  
**DIRECTOR**

| <b>SEMESTER V</b>  |        |  |           |   |    |    |
|--|--------|--|-----------|---|----|----|
| 16.  | LN8303 | Environmental Legislation and EIA                                | 3         | 0 | 0  | 3  |
| 17.  | LN8302 | Dissertation   | 0         | 0 | 6  | 3  |
| 18.  | LN8301 | Advanced Landscape Design Studio II                              | 0         | 0 | 12 | 6  |
| <b>TOTAL</b>   |        |  | <b>12</b> |   |    |    |
| <b>SEMESTER VI</b>   |        |  |           |   |    |    |
| 19.  | LN8401 | Professional Practice of Landscape Architecture                  | 3         | 0 | 0  | 3  |
| 20.  | LN8411 | Thesis   | 0         | 0 | 22 | 11 |
| <b>TOTAL</b>   |        |  | <b>14</b> |   |    |    |
| <b>Total no of credits required for the award of the degree</b>                  |        |  | <b>75</b> |   |    |    |
| <b>List of Electives- M. Arch. (Landscape Architecture)</b>                      |        |  |           |   |    |    |
| 21.  | LN8001 | Application of GIS in Landscape Design                           | 3         | 0 | 0  | 3  |
| 22.  | LN8002 | Computer Applications and Management Information systems         | 3         | 0 | 0  | 3  |
| 23.  | LN8003 | Landscape Management   | 3         | 0 | 0  | 3  |
| 24.  | AA8071 | GIS Modeling in Urban Planning                                   | 3         | 0 | 0  | 3  |
| 25.  | AA8151 | Contemporary Processes in Architectural Design I                 | 3         | 0 | 0  | 3  |
| 26.  | DG8151 | Architecture and Critical Theory                                 | 3         | 0 | 0  | 3  |
| 27.  | DG8451 | Web Design and Portfolio Production                              | 0         | 0 | 6  | 3  |
| 28.  | LN8071 | Sustainability and Energy Conservation in Landscape Architecture | 3         | 0 | 0  | 3  |
| <b>L- Lecture      T- Tutorial      P- Practical / S- Studio      C- Credits</b> |        |  |           |   |    |    |

**OBJECTIVES:**

- Introduction to the characteristics and impact of the landform which are shaped by the forces of the Earth and its influences on the landscape.
- This course introduces these processes and their impact. In addition the objective of the course is also to give detailed knowledge on the soils.

**UNIT I INTRODUCTION 15**

The Earth – Origin of Earth, Solar system. Earth's Structure, Composition, Land and Sea distribution, Earth and its Atmosphere. Rock-Rock forming minerals – Igneous, Metamorphic and Sedimentary rocks, Economic importance of mineral deposits. Geomorphic process : Epigenic or Exogenic process – Weathering, Erosion, Mass wasting, Fluvial cycle, Groundwater, Wind, Seas and Oceans, Glaciers. Hypogenic or Endogenic process – Earth quake, Tsunami, Fold, Fault, and Volcanism, Plate tectonics.

**UNIT II STUDY OF LANDFORMS 12**

Evolution of land forms: Land forms produced by geomorphic process – Reclamation of land forms, Land forms along coasts. Man's intervention into Ecology and Environment- case studies in India, Deterioration of landscapes by Mining of minerals. Suitability of land for various developments. Surface and Groundwater resources management, Quality of water for drinking. Hydraulic effects caused by rapid urbanization.. Concept of rainwater harvesting.

**UNIT III SOIL CHARACTERISTICS 6**

Soil forming minerals – Weathering & Erosion, Soil profile, Role of climate, Rainfall, Vegetation, Topography and Time factors in soil formation. Soil classification, Soil water, Soils of India. Soil properties, Physical, Chemical and Biological properties, Sustainability of soil for development activities.

**UNIT IV SOIL ANALYSIS 6**

Soil analysis, Soil survey and field mapping, land capability classifications. Role of remote sensing in soil mapping.

**UNIT V SOIL MODIFICATIONS 6**

Soil modifications, Problems of soils, Acid, Alkaline, Saline soils, soil pH, Essential mineral nutrients of soils, Manure and Fertilizers. Soil conservation, type, factors, methods of conservation, prevention of soil erosion, Soil conditioning, soil mixtures and alternative to soils.

**TOTAL: 45 PERIODS****OUTCOMES:**

- Characteristics of landforms, causes and effects.
- Soil characteristics, causes and effects and modifications.
- Methods of analysis of soils.

**REFERENCES:**

1. I.P. Abrol and V.V.Dhruva Narayana, Technologies for Wasteland Development, ICAR, New delhi, 1990.
2. Arthur.V.Strahler, Physical Geography, Second edition, John Wiley and sons Inc.,1951.
3. William D. Thornbury, Principles of Geomorphology, John Wiley and sons Inc.,1954.



**OBJECTIVES:**

- Introduction to the characteristics of Plant materials which are an important part of soft landscape, international nomenclature used for plants and their associations in nature.
- To promote understanding of the factors that regulate the growth and characteristics of the plant material.

**UNIT I CHARACTERISTICS OF PLANT MATERIALS 9**

Classification of plant kingdom, rules of nomenclature and identification. Plant processes, water relation, mineral nutrition, photosynthesis and respiration. Stem, root and leaf relationship, growth and flowering, response to stimuli and modification. Plant multiplication and adaptation.

**UNIT II FLORISTIC REGIONS OF INDIA 9**

Different floristic regions and forest types of India. Dominant, endemic, occasional, prevalent species in select types.

**UNIT III PLANT PROPAGATION 9**

Nursery establishment and plant propagation. Establishment and maintenance of grass, shrubs and trees with respect to ground preparation, planting and transplanting, protection of plants during and after planting.

**UNIT IV HORTICULTURAL PRACTICE 9**

Plant nutrition and supplements. Fertilizers and Manures- types, methods of applications, advantages and disadvantages. Common plant pests, diseases and their control, insecticides and their application, weed control. Sustainable practices in pest management and weed control. Water budgeting .

**UNIT V LANDSCAPE MAINTENANCE 9**

Maintenance methodology, maintenance economics and maintenance details for all soft landscape. Equipment for landscape maintenance.

**TOTAL: 45 PERIODS****OUT COMES:**

- Knowledge of Binomial nomenclature of plants.
- Aspects of Plant growth and propagation, thereby understanding the Maintenance requirement of plants.

**REFERENCES:**

1. Raunkier.C., the Life forms of Plants and statistical plant geography, 1934.
2. Venkateswaralu.V.A., Text book of Botany, Vol III, Guntur.
3. Lawrence.H.M., Taxonomy of vascular plants, Oxford, IBH, 1964.
4. Rao.K.N.R. and Krishnamurthy.K.N., Angiosperms, S.Viswanathan Printers and publishers.
5. G.S.Puri, Forest types of India.



**OBJECTIVES:**

- The objective of this course is to equip the students in the techniques of detailing and drawing of Landscape design at site scale.

**UNIT I LANDSCAPE GRAPHICS 5**

Symbols of representation of landscape elements in plan, elevation and section.

**UNIT II DESIGN OF LANDFORMS 15**

Contours – representation of landforms and landform design, interpolation of contours, slope analysis, uses and function.

Grading – symbols and abbreviations, basic grading exercises, grading alignment of paths/roads, angle of repose and use of retaining walls.

**UNIT III EARTHWORK FORMATION 15**

Earth works – principles of earth work, cut and fill calculations – borrow pit method, average end area method, average spot level method, precautions taken in cut and fill methods in relation to soil conditions, amount of precipitation etc.,

**UNIT IV HARD LANDSCAPES 20**

Design and detail of hard landscapes – Roads, paving, barriers, edge conditions – functions, types, criteria for selection, design aspects, details.

**UNIT V OUTDOOR FURNITURE 20**

Criteria for the selection of materials and specifications for the street furniture in various environments. Design of signage and simple outdoor structures like pavilions, gazebos etc.

Use of waste materials in landscape, recycling and reuse of materials, their impact on landscape design.

Preparation of working drawings for hard landscaping and services.

**TOTAL: 75 PERIODS**

**OUTCOMES:**

- Techniques of drawing landscape and site elements.
- Detailing of site elements like earthwork, hard landscape and outdoor furniture.

**REFERENCES:**

- Strom Steven, Site engineering for landscape Architects, John wiley and sons Inc.,2004.
- Charles.W.Harris & Nicholas T. Dines, Time saver Standards for Landscape Architecture, Mc. Graw Hill.
- Jack E. Ingels, Landscaping – Principles & Practices , Pelmer Publishers Inc., 1992
- Grant W Reid, Landscape Graphics, Watson – Guptill publication, New York, 1987.
- David Sauter, Landscape Construction, Pelmer Thomson Learning, 2000.
- Michael Little wood, Landscape Detailing Volume I -IV, Architectural Press, 1993.
- Naoki Mukoda, Street furniture, Bijutsu shuppan – sha Ltd., 1990.



**OBJECTIVES:**

- To study the social and cultural influences on traditional landscapes through analysis of form and space, siting principles of each period with examples.
- To study contemporary landscape and the manifestation in the western and Indian context.

**UNIT I EASTERN TRADITIONS AND ISLAMIC LANDSCAPES 15**

Early traditions and beliefs about landscape and environment in east. Ancient Indian traditions – Vedic, Jainism, Buddhism and later Hindu movements. Symbolic meanings and sacred value of natural landscapes.

Transfer of concepts through Buddhism to China –Chinese landscape development – gardens of China – Pre Buddhist Japanese landscapes – impact of China on Japanese gardens – Japanese gardens.

Nomadic culture of central Asia – advent of Islam – concept of Paradise as a garden – spread of Islamic traditions to the West and East. Eastern expression of Islam – Samarkhand and Mughul India – Tomb and pleasure garden – Moghul concepts of site planning. Western expression of Islam – Spain Alhambra and Generalife, Granada.

**UNIT II RENAISSANCE AND THE EVOLUTION OF NEW THOUGHTS 6**

Development of the enclosed garden in the Middle ages. Renaissance – Italy, France and England, Romanticism. Influences and linkages across cultures. Study of the western landscapes till the nineteenth century.

**UNIT III THE EVOLUTION OF THE MODERN LANDSCAPE 9**

Industrialization and urbanization – impacts and development of the concept of public open spaces, open space development in new towns, parks movement. Open space development and its urban design and planning context, Early industrial towns and the garden city movement. Public park as a major component of urban landscape, the works of F.L.Olmstead, and other pioneers. Open space development and Close conceptual relationship between Town planning, urban design and landscape architecture. Examples.

**UNIT IV THE MODERN MOVEMENT, CONTEMPORARY CONCEPTS AND CONCERNS 9**

Changing concepts of space and the relationship of architecture to landscape. Study of selected works of modern architects and landscape architects. Postwar development in Europe. The influence of Ian Mcharg on Landscape architecture. The works of Jellicoe, Burle Marx and others.

Concept of sustainable landscape development, Cultural landscapes their definition, identification, characteristics, policies, Artistic sensibility in landscape architecture and land art, New development in urban Landscape design.

**UNIT V INDIAN CONTEXT 6**

Issues in contemporary India, Analysis and understanding of philosophies of contemporary landscape works in India, case studies.

**TOTAL 45 PERIODS****OUTCOMES:**

- Relationship between culture and Landscape design.
- Perception of open spaces in different cultures.



## REFERENCES:

1. Garden Cullen, The concise Townscape, Architectural press, London.
2. Kevin Lynch, Image of City, Cambridge, MA, 1961.
3. Henry F. Arnold, Trees in Urban Design, Van Nostrand Reinhold Company.
4. Matthew Carmona, Tim Heath, Public places – Urban spaces, Architectural press, 2003.
5. Michael Hough, Cities and natural process, Routledge, 1995.
6. Donald Watson, Alan plattns, Roberta shibley, Time savers standards for urban design, McGraw hill, 2003.
7. Elements and total concept of urban landscape design, Graphic –sha publishing Co, 2001.
8. Tom turner, city as landscape, Eand FN spon, 1996.
9. Cliff Tandy, Handbook of urban Landscape, Architectural Press, 1970.

**LN8201**

**LANDSCAPE CONSTRUCTION**

**L T P/S C**  
**2 0 4 4**

## OBJECTIVES:

- To train the students in the detailing and drawing of landscape elements and features like lighting, play area, terraces and water features.
- The course discusses the management of water in site through landscape design.

### **UNIT I OUTDOOR LIGHTING 10**

Definition of technical terms, types of electrical lighting, types of fixtures, auxiliary fixtures. Principles of design for outdoor illumination, design and type of effects with electrical lighting. Safety precautions and drawbacks of electrical lighting, electrical accessories and their installation. Solar energy and lighting.

### **UNIT II PLAY AREA AND TERRACE LANDSCAPING 15**

Design of play areas -Totlots to play grounds. Design and detail of play equipments. Considerations, design and detail for terrace landscaping, concept of green roof - intensive and extensive.

### **UNIT III WATER FEATURES 25**

Design of water features such as swimming pools, cascades, fountains etc., and their technical requirements. Consideration for design and detail. Water bodies and natural ponds.

Design of irrigation system – landscape area types, objectives and design, water needs and sources, application, methods of installation. Control systems, scheduling and maintenance.

### **UNIT IV STORM WATER MANGEMENT 10**

Drainage – surface drainage, calculation of surface run off, design of surface and storm water drainage, design of swales and gutters.

### **UNIT V WATER RESOURCES PLANNING 15**

Water shed and their characteristics, urban storm water drainage systems, protection of natural water bodies, water retention structures, water harvesting techniques and devices.

**TOTAL:75 PERIODS**

## OUTCOMES:

- Detailing and drawing of landscape elements and features.
- Water management through landscape design.

**REFERENCES:**

1. David Sauter, Landscape Construction, Pelmer Thomson Learning, 2000.
2. Michael Little wood, Landscape Detailing Volume I-IV, Architectural Press, 1993.
3. Roger Narboni, Lighting the Landscapes- Art Design technologies, Birkhauser, Switzerland, 2004.
4. Halpeth, T.Senthilkumar, G.Harikumar, Light Right, TERI, New Delhi, 2004.
5. Charles.W.Harris & Nicholas T. Dines, Time saver Standards for Landscape Architecture, Mc. Graw Hill.

**LN8202****LANDSCAPE DESIGN STUDIO – I**

| L | T | P/S | C |
|---|---|-----|---|
| 0 | 0 | 12  | 6 |

**OBJECTIVE:**

- The objective of this course is to introduce the students to Landscape design.

Studio work shall deal with an appreciation of basic landscape design issues and elements – simple site planning, use of plant materials for defining and structuring the open spaces, landscape treatment in relation to the buildings, understanding the aesthetic qualities of the plant materials and their associations.

The studio exercises will involve three or four of the following situations – Campus landscape, Group housing, specialized human landscapes at different situations, parks and garden design. Understanding the function and structuring of outdoor spaces would be the underlying theme.

**TOTAL:180 PERIODS****OUTCOMES:**

- Landscape Design of small projects primarily involving site planning and design.
- Introduction to Planting design.

**LN8203****PLANTING DESIGN**

| L | T | P/S | C |
|---|---|-----|---|
| 3 | 0 | 0   | 3 |

**OBJECTIVES:**

- This course discusses in detail about the various aspects of designing plants.
- It also emphasizes on the applications of planting design in the practice.

**UNIT I INTRODUCTION TO PLANTING DESIGN****9**

Introduction to planting design. Plants as living materials, landscape architect's view of plants. Plants as structural, functional and decorative elements. Structural characteristics of plants. Spatial functions of plants, ground level planting, below knee height, knee to eye level, above eye level planting, tree planting.

**UNIT II CREATING SPACES WITH PLANTS****9**

Experience of spaces, use of planting to manipulate spatial experience, elements of spatial composition – enclosure, dynamics and focus. Plant associations. Plant communities, Designing with canopy layers – 3 layers, 2 layers and single layer. Plants as a part of integral habitats.

**UNIT III VISUAL COMPOSITION IN PLANTING DESIGN 9**

Subjective and objective responses to plant material. A study on form, shape, colour, texture, growth characteristics and suitability to different environments. Principles of visual composition- harmony and contrast, Balance, Emphasis, Sequence, Scale, Unity and variety in planting design.

**UNIT IV PLANTING DESIGN FOR HABITAT CREATION 9**

Planting strategies and species for various types of habitats – wooded areas, grassland and meadows, wetlands, coastal edges, waterside and aquatic planting, slope retention, and plants for restoration of disturbed habitats.

**UNIT V APPLICATIONS IN PRACTICE 9**

Study of local plant materials, their botanical, common and regional names, growth characteristics and application in design. Visit to nurseries. Introduction to soft landscape working drawings, planting plans, specifications and estimation.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- Basics of planting design
- Applications of planting design.

**REFERENCES:**

1. Nick Robinson, The Planting Design Hand book, Gower Pub., 1998
2. Brian Hackett, Planting Design, McGraw hill, 1979.
3. Bose. T. K. and Choudhary, Tropical Garden Plants in Colour, Horticulture and Allied Publishers, 1991.
4. Iyengar Gopaldaswamy, Complete Gardening in India, Gopaldaswamy Partha sarathy, 1991.
5. M.S. Randhawa, Flowering trees of India, National Book Trust , India, 1983.

**LN8251 LANDSCAPE ECOLOGY AND PLANNING L T P/S C  
3 0 0 3**

**OBJECTIVES:**

- To understand any developmental activity involves intervention in the natural processes and to minimize the impact due to this intervention.
- To outline the evolution of landscape planning, its premises and the process.

**UNIT I ECOLOGY 9**

Understanding the ecosystem and their functioning — components of ecosystem - natural process- Fundamentals of ecology - Ecological processes and dynamics— understanding ecological concepts like population growth, regulation, carrying capacity- colonization and succession - stability and resilience of ecosystem – ecosystem degradation.

**UNIT II LANDSCAPE ECOLOGY 9**

Introduction to landscape ecology – formation of various landforms – landforms and landscape process – pattern and structure of landscapes– concepts of patch, corridor and matrix - landscape dynamics and function – topological and chorological process within landscape - concept of landscape metrics – understanding dynamic interaction between landscape structure and function – ecological services of landscape.



**UNIT III      LANDSCAPE PLANNING      9**

Relationship between man and nature – analytical aspect of landscape - the natural and cultural setting - evolution of landscape planning –concepts and projects of McHarg, Carl Steinite, Warren Manning, Augus Hills, Phil Lewis – Izank Zonneveld, Ervin Zube - landscape planning models – METLAND concept

**UNIT IV      PROCESS IN LANDSCAPE PLANNING      9**

The purpose of landscape planning – domain and context for landscape planning – principles of planning – procedure in landscape planning - problem defining, goal setting, inventory and analysis - basic of collecting and analyzing, projecting and presenting data in landscape planning, visual assessment and aesthetic dimension.– Suitability analysis – techniques for identifying preferences - Planning options – proposing landscape plan.

**UNIT V      CASE STUDIES: LANDSCAPE PLANNING      9**

Reclamation and restoration of derelict landscapes - conservation and preservation of ecological fragile areas such as wetlands, creeks etc. - conservation ordinances. Case studies on landscape regional planning - policies and landscape.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- Basics of Ecology and Landscape Ecology.
- Landscape planning history, evolution, process and case studies.

**REFERENCES:**

1. Richard T.T.Forman & Michel Godron , Landscape Ecology, John Wiley & Sons; 1986
2. Tom Turner, Landscape Planning and Environmental Impact Design, UCL Press, London, 1998.
3. Ervin H. Zube, Robert O Brush, Julios G.Y.Fabos, Landscape assessment – values, perceptions, 1975.
4. G. Tyler Miller Jr., Living in the Environment: Principles, Connections, and Solutions, Brooks / Cole publishers co., 2004.
5. William M. Marsh, Landscape planning – Environmental Application, John Wiley and sons Inc., 1997.

**LN8301      ADVANCED LANDSCAPE DESIGN STUDIO– II      L T P/S C**  
**0 0 12 6**

**OBJECTIVE:**

- The objective of this course is to train students in advanced landscape design involving complex situations that require handling of multiple information and contexts.

The studio exercises will involve three or four of the following situations – urban context, historical landscape, specialized landscape situations, industrial landscapes, recreational landscapes. Understanding of ecologically sustainable development would be the underlying theme.

**TOTAL:180 PERIODS**

**OUTCOME:**

- Training in advanced Landscape design.

**OBJECTIVE:**

- To promote research in Landscape architecture. In addition this course will also train the students in collecting, critically analyzing and presenting information in a logical sequence.

Topics related to various aspects of Landscape Architecture could be chosen in consultation with faculty members, comprehensively researched and findings presented in a series of seminars by individual students. The materials would be documented and formally presented as a dissertation at the end of the semester.

**TOTAL: 90 PERIODS****OUTCOMES:**

- Research on a chosen topic.
- Expertise in collecting, processing and presenting relevant information.

**OBJECTIVE:**

- To familiarize the students to the environmental legislation and its components and its role in checking the damage to the environment

**UNIT I COMPONENTS OF ENVIRONMENT 6**

Environmental sciences, Environment – definition, important components, quality of total environment.

**UNIT II HUMAN IMPACT ON ECOSYSTEMS 12**

Environmental impact of man's activities on earth, impacts of agriculture, industrialization, urbanization. Relations between local modification and global phenomena. Green house effect, acid rain etc., Pollution – definition, pollution of air, water, land and noise, effect on humans, vegetation and other life forms, degradation of land. International treaties on environment, sustainable development – ecological and environmental parameters, public participation and role of NGOs. Status of environment in India.

**UNIT III ENVIRONMENTAL LEGISLATION 9**

Concept of law constitution in relation to environment. Introduction to town planning legislation and legal tools for development control and their relationship for landscape design objectives. Indian forests acts – preserved, protected, private and village forests, wild life sanctuaries act. Legislative and administrative framework for national parks in U.K., U.S.A. and India. Periphery control legislation and green belt concept. Preservation of the countryside.

**UNIT IV CONSERVATION AND PRESERVATION 9**

Legislation relating to preservation of parks, open spaces, playgrounds, trees and ancient monuments. Legislation related to air, water, Land pollution prevention



**UNIT IV ENVIRONMENTAL IMPACT ASSESSMENT 9**  
Environmental impact assessment – definitions, methodologies, techniques, advantages and disadvantages. Process – data collection, identification of study area, scope, aim, environmental standards and their measurement. EIA in India, legislation related to EIA, EIA in developed and developing countries

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- Background and evolution of Environmental legislation.
- The various legislation concerned with the environment.
- EIA and its components

**REFERENCES:**

1. Michael Allaby, Basics of Environmental Science, Routledge, 2000.
2. Avjit gupta and Mukul.G.Asher, Environment and the developing world, John wiley and sons, Inc, 2000.
3. Larry W.Canter, Environmental Impact Assessment, McGraw – Hill, Inc,1996
4. H.N.Tiwari, Environmental Law, Allahad law agency, 1997.
5. Rosencrany, a.Diwan, Noble.M, Environmental law and policy in India (Cases, Materials, and statutes), Tripathi Bombay, 1991.

**AA8351 RESEARCH METHODOLOGIES IN ARCHITECTURE L T P/S C**  
**3 0 0 3**

**OBJECTIVES:**

- To make the students to distinguish various theoretical ideologies influencing the philosophy and values of architecture.
- To establish the sense of systematic inquiry in students mind to analyze and infer the issues and aspects relating to Architecture.

**UNIT I INTRODUCTION 9**

Basic research issues and concepts- orientation to research process- types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods- illustration using research samples

**UNIT II RESEARCH PROCESS 9**

Elements of Research process: finding a topic- writing an introduction- stating a purpose of study- identifying key research questions and hypotheses- reviewing literature- using theory- defining, delimiting and stating the significance of the study, advanced methods and procedures for data collection and analysis- illustration using research samples

**UNIT III RESEARCHING AND DATA COLLECTION 9**

Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics  
Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages, sampling- Problems encountered in collecting data from secondary sources-

**UNIT IV REPORT WRITING 6**

Research writing in general- Components: referencing- writing the bibliography- developing the outline- presentation; etc.

**UNIT V CASE STUDIES****12**

Case studies illustrating how good research can be used from project inception to completion- review of research publications

**TOTAL: 45 PERIODS****OUTCOMES:**

- The student will develop the skill to identify, decipher and interpret the issues relating to Architecture, based on research enquiry methods.
- The student will widen the information and will prepare the students for scientific method of researching and research process.

**REFERENCES:**

1. Linda Groat and David Wang; Architectural Research Methods;
2. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; The Craft of Research, 2<sup>nd</sup> Edition; Chicago guides to writing, editing and publishing;
3. Iain Borden and Kaaterina Ruedi; The Dissertation: An Architecture Student's Handbook; Architectural Press; 2000
4. Ranjith Kumar; Research Methodology- A step by step guide for beginners; Sage Publications; 2005
5. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2002

**LN8401****PROFESSIONAL PRACTICE OF LANDSCAPE ARCHITECTURE****L T P/S C  
3 0 0 3****OBJECTIVE:**

- The objective of this course is to educate the students on the various aspects of a Landscape design practice.

**UNIT I THE PROFESSION OF LANDSCAPE ARCHITECTURE****6**

Brief history of profession, Professional career tracks, Registration and License, professional ethics and code of professional conduct.

**UNIT II PRINCIPLES OF PROFESSIONAL PRACTICE****9**

The client- different kinds of clients and projects, general concept for engaging the services of landscape architect. The extent and variety of services performed by landscape architect, terms and conditions.

**UNIT III PROFESSIONAL RELATIONSHIPS****9**

Interface with other consultants and contracting agencies. Prime consulting, Multiple direct- consulting, Sub consulting relationships. Relationship between the Landscape architect and Clients, Allied professional, contractor, General public.

**UNIT IV PROFESSIONAL APPROACH****12**

Methods of working – surveys, preparation of policy and design proposals. Reports, contents and production techniques. Types and contents of Drawings prepared in a landscape architect's office. Contracts- Definition and terminologies, Contract documents. Preparation of tender documents. Different types of tender.

**UNIT V PROJECT MANAGEMENT****9**

Planning, and organizing the project. PERT and CPM. Project supervision, co-ordination between different agencies, Monitoring a project during execution and preparation of site reports.

**TOTAL: 45 PERIODS****OUTCOMES:**

- Knowledge about landscape consultancy practice.
- Information about the profession.

**REFERENCES:**

1. Walter Rogers, The Professional practice of landscape architecture, Van nostrand Reinhold, 1997.
2. John.L.Motloch, Introduction to Landscape design, 2001.
3. Jack.E.Ingels, Landscaping, Principles and Practices, Delmar publishersinc, 1992.
4. W.F.Hill, Landscape handbook of Tropical Landscape, Garden Art Press, 1995.

**LN8411****THESIS****L T P/S C  
0 0 22 11****OBJECTIVE:**

- The objective of this course is to train the students to work individually on projects.

Thesis will be an individual project dealing with complex problems of landscape architecture including site planning and landscape planning and seeks to develop concepts of landscape design as an interactive process of natural and man-made environment.

**TOTAL:330 PERIODS****OUTCOME:**

- Training in handling projects alone.

**LN8001****APPLICATION OF GIS IN LANDSCAPE DESIGN****L T P/S C  
3 0 0 3****OBJECTIVES:**

- GIS is being increasingly used worldwide for landscape planning and restoration projects.
- The objective of the course is to train the students in the application of GIS in Landscape design.

**UNIT I INTRODUCTION****6**

Classification of Spatial and non-spatial data - spatial relationships among elements / activities – fundamentals of topological relationship - spatial data and their representation in maps - raster and vector based system to representing spatial objects - objective and functions Geographical Information System – GIS software in general - over view of GIS map components.

**UNIT II MAP PREPARATION AND DISPLAYING****12**

Basics of GIS maps preparation – digitization of spatial data - concept of point, line and polygon features - fundamental of coordinate system – map layers and geo-referencing – displaying spatial features – adding attribute values to the features – preparing and displaying thematic layers and maps - selecting and editing spatial features and attribute data - preparing Grid surfaces form point, line and polygon features.

*Attested**Sobhan*  
**DIRECTOR**

**UNIT III SPATIAL ANALYSIS USING GIS 9**

Spatial joining - concept of geo processing – union, intersect, clip and merge – features to raster - preparing surfaces - creating TIN surfaces and contours - surface analysis – spatial joining of geographic features.

**UNIT IV APPLICATIONS OF GIS IN LANDSCAPE ARCHITECTURE 6**

Overlaying features and analyzing using overlay function – feature selection – buffering – table joining and analysis - manipulating attribute data – classification and reclassifications - GIS modeling – 3D display.

**UNIT V LANDSCAPE PLANNING AND GIS 12**

Introduction to landscape GIS model - Case problem on landscape analysis – suitability analysis using GIS – preparing land-use maps – landscape impact analysis using GIS - landscape suitability analysis – application of GIS in assessing Landscape Ecological risks.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- Techniques of Map preparation and analysis using maps.
- Application of GIS in Landscape Architecture.

**REFERENCES:**

1. Brail K.R (1990) Integrating GIS into Urban Regional Planning, Alternative approaches for developing countries, regional development Dialogue, Vol.11, No.3 UNCRD, Japan, 1990.
2. Karen C.Hanna, GIS for Landscape Architects, ESRI press, 1999.
3. Andy Mitchell, GIS Analysis Volume 1. Geographic patterns and Relationships, ESRI Press 2005.
4. David Maquire and Michael Batty (Editors) GIS, Spatial Analysis and Modeling, ESRI Press, 2005.
5. Cynthia A. Brewer, Designing Better Maps: A Guide for GIS Users, ESRI Press

**LN8002 COMPUTER APPLICATIONS AND MANAGEMENT L T P/S C**  
**INFORMATION SYSTEMS 3 0 0 3**

**OBJECTIVE:**

- To aid the students in gaining understanding of the various computer programs that can be used by them in their presentations.

**UNIT I INTRODUCTION 9**

The use of computer software (Photo-Shop and Illustrator) for the processing of words and images. Issues, ideas, themes of representation and imaging in digital media using some of graphic material.

**UNIT II APPLICATION OF COMPUTERS IN THE DESIGN PROCESS 9**

Various projection and graphic techniques. Developing skills in visualization and eidetic representation using the computer as tool for developing design projects. Advanced work with Photo-Shop and Illustrator, and in particular techniques with AutoCAD.

**UNIT III COMPUTERS AND DESIGN PRESENTATIONS 9**  
Means for integration of fundamentals and techniques. The interactive realm of 3D modeling and animation using primarily FORM-Z modeling programs.

**UNIT IV NON LINEAR PRESENTATION ( FLASH AND DIRECTOR) 9**  
Importing files using standard and linking options. Using scripts and behaviors, understanding stage, cast and time line, using cast library, Tweening, using swf movie, presentation using voice over and presentation demos, creating auto run cd roms.

**UNIT V CASE STUDIES 9**  
Exploring the various design media as they relate to form, image, sequence, movement, and animation through a series of weekly exercises.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- Knowledge about computer software that can be used for presentations
- Application of these programs in producing their design presentations.

**REFERENCES:**

1. J.Jeffcoate, Multimedia in Practise: Technology and Applications, Prentice hall, New jersey, 1994.
2. Apple computer Inc., Multimedia demystified – a guide to the world of multimedia, Random house, New Media, Newyork, 1994.
3. Kirk, Ross and Hunt, Andy, Digital Sound Processing for music and multimedia, Focal press, Oxford, 1999.
4. S.Robert Tannenbaum, Theoretical foundations of Multimedia, Computer Science Press, Newyork, 1998.
5. Mark Von Wodtke, Mind over media: creative thinking skills for electronic media, McGraw hill, Newyork, 1993

**LN8003 LANDSCAPE MANAGEMENT L T P/S C**  
**3 0 0 3**

**OBJECTIVES:**

- To introduce the students to Landscape management is an integral part of Landscape planning and design
- This course elaborates on the various techniques for assessment and valuation of natural resources and their management.

**UNIT I INTRODUCTION 9**  
Fundamentals and concepts in Environmental Economics– Ecosystem Services and Valuation - natural capitals and their benefits to the society– externalities and public goods – non renewable resource depletion and their social costs - intangible cost associated with social and cultural changes – Economics of global climate change – Kyoto protocol – pollution control and Carbon trading - Economic definitions of sustainability - Ecological vs. Economic sustainability.

**UNIT II ENVIRONMENTAL ECONOMICS IN LANDSCAPE 9**  
Valuation of landscape services– measuring benefits and cost- tangible costs of landscape development, capital and maintenance cost - modification of natural system and environmental costs.





**OBJECTIVE:**

- To examine the role and application of Geographic Information Systems in environmental design, community charities and other urban design projects.

**UNIT I INTRODUCTION 6**

GIS – Spatial data, non Spatial data, Plan, Map, Scale, Map Projection, GPS, GCP collection, Spectral signature curve, Image processing – Geo coding / Geo referencing, GIS software, Two tier architecture, Three tier architecture, Thin client, Thick client

**UNIT II DATABASE CONCEPTS 9**

Data structures, Databases, Files, Types of Tables, Table operations, Creating a Table, Accessing Records in a Table, Manipulating records in a Table, Modifying Table structure, Reports, Advantages of database, Primary key and data access, Composite primary key, Defining a primary key, Sorting, Indexing, Master Detail relationships, Types of relationships, Foreign key, Deleting, updating and adding records to linked tables, ER Diagram, Data Model – Physical, logical and conceptual.

**UNIT III SPATIAL DATA 9**

Comparative methods for obtaining images, Aerial Photograph, Satellite Imagery – High resolution imagery – LISS, PAN, MSS – Ortho rectification, Digitization – Layers, Digital Elevation model, Digital Terrain Modelling, Existing maps – Problems and Issues, Rubber sheeting, Digitization, overlay, union, intersection.

**UNIT IV INTRODUCTION TO GIS SOFTWARE 9**

Arc Info – Coverage – Arc, Node, Tics, Add, get, put, Map extent, edit, Topology creation – Clean, Build, Tables – Creating tables, updating tables, join, drop item, Export, Import, overlay, union, intersection, buffer.

**UNIT V MODELLING GIS PROJECTS FOR URBAN AREAS 12**

Preparation of Land use map, Land use suitability analysis, Screen design, Visual Basic application using Map objects.

**TOTAL:45 PERIODS****OUTCOMES**

- The student will increase the knowledge on GIS and the various characteristics of Data.
- The student will accept the potential of GIS and develop integrated practice of using the GIS application with architecture.

**REFERENCES:**

- Information systems for Urban Planning – Robert Laurini
- Modelling our world – ESRI Press
- An Introduction to Data base Systems – C.J.Date
- Fundamentals of Data base Management System by Elmasri & Navethi
- ESRI (1992) Understanding GIS, The Arc Info Methods, ESRI, USA



**OBJECTIVES:**

- To investigate the contemporary theories of media and their influence on the perception of space and architecture.
- To provide an overview of various contemporary design processes and its relation to computation.

**UNIT I INTRODUCTION 6**

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

**UNIT II ASPECT OF DIGITAL ARCHITECTURE 9**

Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence on Architectural Form and Space

**UNIT III CONTEMPORARY PROCESS 12**

Overview of various Contemporary design process and its relation to computation: Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid Design Protocols – Concept of Emergence - Introduction to Cellular Automata and Architectural applications – Genetic algorithms and Design Computation

**UNIT IV GEOMETRIES AND SURFACES 12**

Fractal Geometry and their properties – Architectural applications - Works of Zvi Hecker – Shape Grammar - Shapes, rules and Label - Shape Grammar as analytical and synthetic tools- Combining Shape grammar and Genetic algorithm to optimize architectural solutions - Hyper Surface– Introduction to Hyper surface and concepts of Liquid architecture.

**UNIT V CASE STUDIES 6**

Case studies- Study, understanding and analysis of known examples at the national and international levels which demonstrates the contemporary theories of media and their influence on the perception of space and architecture, contemporary design processes and its relation to computation.

**TOTAL:45 PERIODS**

**OUTCOMES:**

- Understanding of the effect of contemporary theories of media on contemporary architectural design.
- Understanding of various contemporary design process and their relation to computation

**REFERENCES:**

1. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries
2. MOVE, UN Studio
3. Grey Lynn, The Folded, The Pliant and The Supple, Animate form
4. Contemporary Techniques in Architecture, Halsted Press, 2002
5. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000.

6. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction Colin press, 1977
7. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
8. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
9. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000.

**DG8151                      ARCHITECTURE AND CRITICAL THEORY                      L T P/S C**  
**3 0 0 3**

**OBJECTIVES:**

- To introduce the idea of architecture as enmeshed in the society and a product of larger socio-cultural issues and practices, and not as an autonomous object determined by a hermetically sealed discipline.
- To introduce the various interdisciplinary critical theories and explain their interpretation of architecture.

**UNIT I                      INTRODUCTION                      6**

Definition of theory - Architectural theory and its nature, purpose and its relation to practice - overview of some traditional architectural theories- context for the rise of more critical theories in architecture – Introduction to Critical Theory- Architecture and Critical Theory.

**UNIT II                      POWER AND BUILT ENVIRONMENT                      10**

Definition of power- Forms of power- Power in the built environment at various scales- ideas of power and society, power-knowledge- Colonialism in India as a form of dominance- introduction to architecture and urbanism of colonialism in India- Production of Indo-Saracenic architecture- New Delhi as a part of imperial vision - Case studies of the architecture and urbanism of power in the modern world.

**UNIT III                      PLACE AND ARCHITECTURE                      10**

Critical reactions to modernity/ modernism with reference to the concept of context/ place- Critical Regionalism and architectures of resistance- Place and phenomenology in architecture

**UNIT IV                      SEMIOTICS AND ARCHITECTURE                      10**

Architecture as communication and representation- introduction to linguistic concepts of semiotics, structuralism, post structuralism and deconstruction- brief over view of postmodern and deconstructivist architecture with reference to these concepts

**UNIT V                      CONTEMPORARY ISSUES IN ARCHITECTURE                      9**

Conditions of late capitalism and postmodern society- Society of spectacle- Architecture as spectacle and seduction- Theme parks and shopping malls- privatisation of public spaces- aesthetisation of architectural issues- influence of globalisation and digital revolution on architectural processes- debates of heritage- gender and space



2. Flash Web Design, The Art of Motion Graph, Curtis Hillman, New Riders Publishing, Indianapolis, IN. U.S.A, 2000
3. M.E. Morris, and R.J. Hinrichs, Web Page Design, Prentice Hall, 1996.
4. Mark Von Wodtke, Mind over Media : Creative Thinking Skills for Electronic Media, McGraw-hill, New York, 1993
5. Adobe Flash CS3 professional on demand by Steve Johnson, Andy Anderson, Perspection inc, 2012.

## REFERENCES

1. Adobe Photoshop CS3 studio techniques, Ben Wilmore, 2012.
2. Adobe Dreamweaver CS6 classroom in a book, Adobe creative team, 2012.

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|---------------|--|------------------------------|
| <b>LN8071</b> | <b>SUSTAINABILITY AND ENERGY CONSERVATION<br/>IN LANDSCAPE ARCHITECTURE.</b> | <b>L T P/S C<br/>3 0 0 3</b> |
|---------------|--|------------------------------|

## OBJECTIVES:

- To expose the students on the issues of sustainability at the global level.
- To focus on the energy conservation landscape and sustainability at the micro level.
- Sustainable landscape design for various climates of India

### **UNIT I INTRODUCTION TO SUSTAINABILITY 10**

Need and concept of sustainability, Brundtland report, World Commission on environment and development, sustainable development, sustainable growth, sustainable economy and sustainable use. Visions of sustainability. Source and ethics of sustainability. Sustainability and Climate Change.

### **UNIT II SUSTAINABLE SITE 7**

Sustainable site – LEEDS, BREAM, rating erosion and sedimentation control, site selection, urban development, landscape and exterior design etc., Green Building in the context of sustainability. Ecology and sustainability. Eco-City.

### **UNIT III INTRODUCTION TO ENERGY CONSERVATION IN LANDSCAPE 9**

Energy conservation and sustainability, principles of energy systems, energy and global environment, scope for energy conservation in landscape.

### **UNIT IV ENERGY CONSERVATION METHODS IN LANDSCAPE ARCHITECTURE-CASE STUDIES 10**

Various methods of energy conservation in landscape architecture, energy conservation techniques in various climates- hot and humid, hot dry, etc. Energy efficient site planning and landscape development. Energy efficient planting design. .

### **UNIT V SUSTAINABLE LANDSCAPE PRACTICES 9**

Sustainable landscape maintenance and management, Sustainable planning and city form. Sustainable urban landscape, landscape sustainability at the national and regional level.

**TOTAL: 45 PERIODS** *Attested*

**OUTCOMES:**

- Understanding of sustainability from macro to micro level.
- Knowledge on Energy conscious Landscape design

**REFERENCES:**

1. John.F.Benson and Maggie.H.Roe, Landscape and sustainability, John Wiley Publication, New York, 2000.
2. O.R.Gray, Landscape Planning for Energy Conservation,
3. Anne Simon Moffat and Marc Schiller, Landscape design that saves energy, William Monow and co.,Inc., New York, 1981.
4. Publications of Centre for science and environments, TERI, New Delhi

