**Course Name: Introduction to Ecology and Landscape**

**Number of credits: 3 ECTS**

**Period: Spring semester**

|  |  |
| --- | --- |
| Coordinating institution | Nirma University |
| Lecturer | **Prof Shweta Suhane and Prof. Sneha Ramani** |
| Level | Bachelors |
| Course duration | 15 Weeks |

**Overall introduction (main concept and understanding)**

This topic will introduce ecology, interactions in an ecological community, ecological cycles, impact of architectural design on sustainability and landscape to second-year bachelors in architecture students.

**Keyword (5-8 words)**

Ecosystem, Ecology, Landscape, Biodiversity, Ecological Phenomena

**Target audience**

Bachelors in Architecture (Sem III)

**Prerequisite**

NA

**Objective**

The main course objective is to introduce basic concepts of ecology and landscapes to students to build a strong foundation for future courses. The focus will be more on the role of ecology and landscape in an ecosystem. The main objectives are:

* To define the ecology and landscape.
* To identify the significance of ecology and landscape to humans, and the built environment.
* To inculcate knowledge about natural selection, ecology, community, biodiversity, climate change and sustainability.

**General learning outcome**

By the end of the course, successful students will:

|  |  |
| --- | --- |
| Knowledge | * Develop an understanding of basic concepts of landscape systems. |
| Comprehensive | * Understand ecological issues pertaining to human settlements and design interventions. * Learn about major ideas of natural selection, ecology, community, biodiversity, climate change and sustainability. |
| Application | * Using and applying the knowledge to design sustainable structures. |
| Analysis | * Identifying and analyzing the impacts and significance of ecology and landscapes in an urban fabric. |
| Synthesis | * Integrate the connection between human activities and current issues related to ecosystems. |

**Course materials**

|  |  |
| --- | --- |
| **Unit** | **Syllabus** |
| Unit-I | Introduction to Ecology –   * Discussion and discourse on assessing the Value of Ecosystem and Ecosystem Services |
| Unit-II | Interaction in Ecological community –   * Time problem – Based on population and prediction of change over time – assess the prediction based on their ecological logic and feasibility. |
| Unit-III | Ecological cycle –   * Inter-relationships between ecological cycles * Discuss how ecological flows are interrelated and compare and contrast different ways of representing information on a concept map. |
| Unit-IV | Impact of Architectural Design on sustainability –   * Exploring Building Life Cycle Assessment through digital and physical models |
| Unit-V | Introduction to Landscape –   * Definitions of Landscape terminologies * Elements of Landscape: Natural / Manmade. (Lightening, Paving, Fencing & Edging, Stones, Wood, Plants, water, Landform, Timber, Metal, Glass). |
| Unit-VI | Understanding the Site, Role of Vegetation & Planting –   * Introduction to site features, topography / Land Forms, Wind flow, Air quality, Hydrology, climate and vegetation * Understanding TREE Architecture / FORM- Identification, botanical, common name, type, native- exotic, Span, height, girth, Life, Purpose, Flowering & fruiting  season/ colour, etc., climatic consideration |

* PPT for Unit 4 and 5

(<https://drive.google.com/file/d/1a-J07Ac8rA648cSnHmbJdu_WYZSjS389/view?usp=sharing>)

(<https://drive.google.com/file/d/1IPKb_EgBkkZK_LSkiuxFFoslANkCEIlf/view?usp=sharing>)

(<https://drive.google.com/file/d/1ec-ZHqemkMUmIh6nCAZ0lcnBZ1zNetC_/view?usp=sharing>)

(<https://drive.google.com/file/d/1BZxcJzSF7aC8McXQfSKwUARPGwf6ZX4b/view?usp=sharing>)

**Self-examination question and assignment**

Course assignments will constitutes multi-part projects:

***Ecology Assignments:***

**Assignment #1** Narrate the experience of adoption of a plant and upload the same in a ppt on a weekly basis.

**Assignment #2** Research building materials and its ecological impacts.

**Assignment #3** Use visual/ graphic media to explain their perspective of the environment and built built-environment.

**Assignment #4** A group assignment of 5 students where students dissect the image of a landscape to understand different parts of an ecosystem.

**Assignment #5** A 300-word essay on the role of humans in the ecosystem.

**Assignment #6** A group of two students presented two different ecosystems each and explain their intent of choosing their particular ecosystem.

**Assignment #7** In continuation of the previous assignment, explore how one can conserve that system and understand systems in an ecosystem.

**Assignment #8** A group of two students presented two different ecosystems each and explain their intent on choosing their particular ecosystem.

***Landscape Assignment:***

**Assignment #9** Childhood memory of a landscape in form of an essay, drawing or poem.

**Assignment #10** Describe 2 contextual landscape images with following association: elements/ moods and feelings/ colours/ conditions.

**Assignment #11** Individual research on landscape term (definition, origin of the word, description, functions, advantage and disadvantage, material options and some common examples).

**Assignment #12** Class exercise: Identifying the learning of the course and explain it how it has helped the students in translating it into their studio exercise.

**Literature**

1. McHarg, I. L. (1969). *Design with nature* (pp. 7-17). New York: American Museum of Natural History.
2. Stiling, P. D. (1996). *Ecology: theories and applications* (Vol. 4). Upper Saddle River, NJ: Prentice Hall.
3. Clarke, G. L. (1965). Elements of ecology. *Elements of ecology.*, (704).
4. Hall, B., & Strickberger, M. W. (2008). *Strickberger's evolution*. Jones & Bartlett Learning.
5. Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of ecology* (Vol. 3, p. 5). Philadelphia: Saunders.
6. Coulson, R. N., & Tchakerian, M. D. (2010). *Basic landscape ecology*. KEL Partners Incorporated.
7. Wu, J. (2013). Landscape sustainability science: ecosystem services and human well-being in changing landscapes. *Landscape ecology*, *28*(6), 999-1023.
8. Turner, M. G., Gardner, R. H., O'neill, R. V., & O'Neill, R. V. (2001). *Landscape ecology in theory and practice* (Vol. 401). Springer New York.
9. Naveh, Z. (1994). From biodiversity to ecodiversity: a landscape‐ecology approach to conservation and restoration. *Restoration ecology*, *2*(3), 180-189.
10. Gergel, S. E., & Turner, M. G. (Eds.). (2017). *Learning landscape ecology: a practical guide to concepts and techniques*. Springer.
11. FIELDING, A. (1999). Principles and Methods in Landscape Ecology BY ALMO FARINA xii+ 235 pp., 24.5× 19× 1.3 cm, ISBN 0 412 73040 5 paperback,£ 24.99, London, UK: Chapman and Hall, 1998. *Environmental Conservation*, *26*(1), 75-78.
12. Beck, T. (2013). *Principles of ecological landscape design*. Island Press.
13. Motloch, J. L. (2000). *Introduction to landscape design*. John Wiley & Sons.
14. Liversedge, J., & Holden, R. (2014). *Landscape architecture: an introduction*. Hachette UK.
15. Potteiger, M., & Purinton, J. (1998). *Landscape narratives: Design practices for telling stories*. John Wiley & Sons.

**Course workload**

The table below summarizes course workload distribution:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activities** | **Learning outcomes** | **Assessment** | **Estimated workload (hours)** |
| **In-class activities (45 hours)** | | | |
| Lectures | Understanding theories, concepts, methodology and tools | Class participation | 29 |
| In-class assignments and discussion | Explore different aspects of ecology and landscape in groups of 2-3 to understand different perspectives of the same. | Class participation and preparedness for assignments | 10 |
| Group presentation | Ability to interpret data, and use the concepts, tools, and methods for communicating the ecology and landscape design. | Quality of group assignments and individual presentations | 6 |
| **Independent work (80 hours)** | | | |
| Individual course assignments and presentations | Ability to conceptualize and frame an ecology and landscape problem, find related literature and data, interpret data, use the concepts, tools and methods covered in the course. | Quality of assignments and individual presentations | 40 |
| Course group assignment and project | Ability to conceptualize and frame an ecology and landscape problem, find related literature and data, interpret data, use the concepts, tools and methods covered in the course. | Quality of presentation | 25 |
| Group presentation | Ability to interpret data, analyze audience, and use the concepts, tools, and methods for communicating the ecology and landscape | Quality of group assignments and individual presentations | 15 |
| ***Total*** |  |  | ***125 hours*** |

**Grading**

The students’ performance will be based on the following:

|  |  |
| --- | --- |
| **Assessment** | * Progress assessment (50%):   - Assignments (50%): students have to complete the quiz or exercise of each topic.     * Final assessment (50%): * Mid-Sem Project Work (30%): The students in a group of 5 selected an article related to natural phenomena like glacier retreat from Down to Earth magazine/ website and describes the ecology phenomena. Additionally, a class assignment was given where students explored how ecology fit in the design process for an architectural project. * Final Project (20%): Present one Indian/ International Landscape project. |
| **Evaluation** | A+ (10)  A (9)  B+ (8)  B (7)  C+ (6)  C (5)  Interim Fail (0)  Final Fail (0) |