



# Ecology and Environmental Science: Syllabus

(Session: 2022-23)

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# Syllabus:

- **Unit-I: Environment & Ecosystems**

**Segments of Environment:** Atmosphere, hydrosphere, Lithosphere, biosphere.

**Cycles in Ecosystem:** Water, Carbon, Nitrogen. Importance of ecosystem, Bioaccumulation, Biomagnification. Biodiversity, Threats to biodiversity, Conservation of biodiversity, National Biodiversity act

- **Unit-II: Air and sound Pollution**

**Air Pollution:** Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Greenhouse effect, ozone layer depletion, acid Rain, carbon sequestration, cloud seeding

**Sound Pollution:** Causes, controlling measures, measurement of sound pollution, Industrial and non-industrial.





# Syllabus:

- **Unit-III: Water and Soil Pollution**

**Water Pollution:** Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

**Soil Pollution:** Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

- **Unit-IV: Research, and Policies related to Environment:**

Recent research on detection of water and air pollution using various nanostructures, Ecological Models and Applications for Pollution and Diseases spread detection

Environment protection Act, national forest policies, wildlife protection act.





# Evaluation Pattern:

Component	Duration	Marks
Mid Semester Test	One Hour	30
Lab/Project Assignment	Lab: Once in a Week Project: 30 days	30
Major Test	Two Hour	40
Total Marks		100





# Experiment

Exp. No.	Name of Experiment
1	<b>To study the effect of light Intensity on the growth of plants</b> <b>Learning Outcomes:</b> the significance of light in plant growth.
2	<b>To determine pH of a given water sample</b> <b>Learning Outcomes:</b> understanding the PH scale and how to test PH.
3	<b>Determination of Hardness in Water</b> <b>Learning Outcomes:</b> The students will learn the fundamentals of water hardness, as well as how to test Hardness in water.
4	<b>To determine total solids of given sample</b> <b>Learning Outcomes:</b> To become familiar with the methods and abilities involved in analyzing water hardness.
5	<b>To Determine of Alkalinity of water</b> <b>Learning Outcomes:</b> To understand the terms alkalinity and acidity, as well as how to test alkalinity in water.
6	<b>To determine chloride in a given water sample</b> <b>Learning Outcomes:</b> To be able to test for chlorides in water and to recognize the words used to explain the others.





# Experiment

Exp. No.	Name of Experiment
7	<b>Measure mineral and phenolphthalein acidity of water</b> <b>Learning Outcomes:</b> To understand the terms mineral and phenolphthalein acidity, as well as how to test acidity in water.
8	<b>Development of Graphene based Nano sensor simulation model for detecting air polluted (CO<sub>2</sub>,CO, SO<sub>2</sub>) gases</b> <b>Learning Outcomes:</b> Practical experience with laboratories Procedures and sampling tools are learning to ensure that a graphene-based Nano sensor simulation model is appropriate for process control, including the detection of air-polluting gases.
9	<b>Development of Graphene based Nano sensor simulation model for detecting soil pollutants</b> <b>Learning Outcomes:</b> Employed a computer model of a Nano sensor based on graphene that is being taught to be effective for measuring quality, including the detection of soil contaminants.
10	<b>Detection of Noise level and vibration by using sound level meter</b> <b>Learning Outcomes:</b> To understand the terms Noise pollution, as well as how to detect noise pollution through sound level meter.
11	<b>Plantation of one fruit tree and submit the growth report of tree at the end of semester</b> <b>Learning Outcomes:</b> To understand the how to fruit tree grow, as well as a small contribution to maintain the initiative clean and green environment of ABV-IIITM.
12	<b>Disease spread prediction using Ecological Models:</b>





# References:

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.
2. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.
3. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.
4. Keller, E.A. 2011. Introduction to Environmental Geology (5th edition). Pearson Prentice Hall.

