Introduction to Environmental Studies

B. Tech 3rd Semester

Multidisciplinary nature and scope and objective of environmental studies

Unit 1

Department: Chemistry
Subject: IES (CHM 2041)

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Introduction

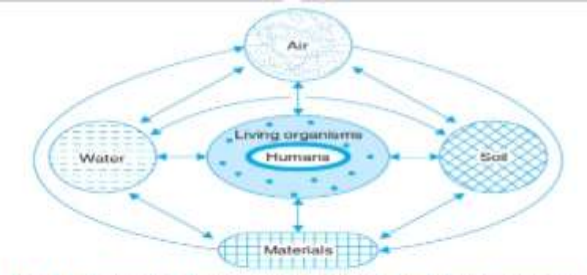


Fig. 1.1 Concept of Environment: air, water, land, living organisms and materials surrounding us and their interactions together constitute environment.

- The word 'Environment' is derived from the French word 'Environner' which means to encircle, around or surround
- **Environment:** The circumstances and conditions surround and affect/ influence the growth and development of a organism.
- Environment is the sum total of land, water, air, interrelationships among themselves and also with the human beings and other living organisms
- 2. Douglas and Holland defined that 'The term environment is used to describe, in aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms'.

Introduction

- Environmental Science: is the interdisciplinary field and it is the study of the interactions among the physical, chemical and biological components of the Environment with a focus on environmental pollution and degradation.

The term 'Ecology' is derived from Greek word 'Oekologue' which is composed of two words:
(a) 'Oekos' means surrounding
(b) 'Logs' means study on a whole ecology means 'Study of surrounding'

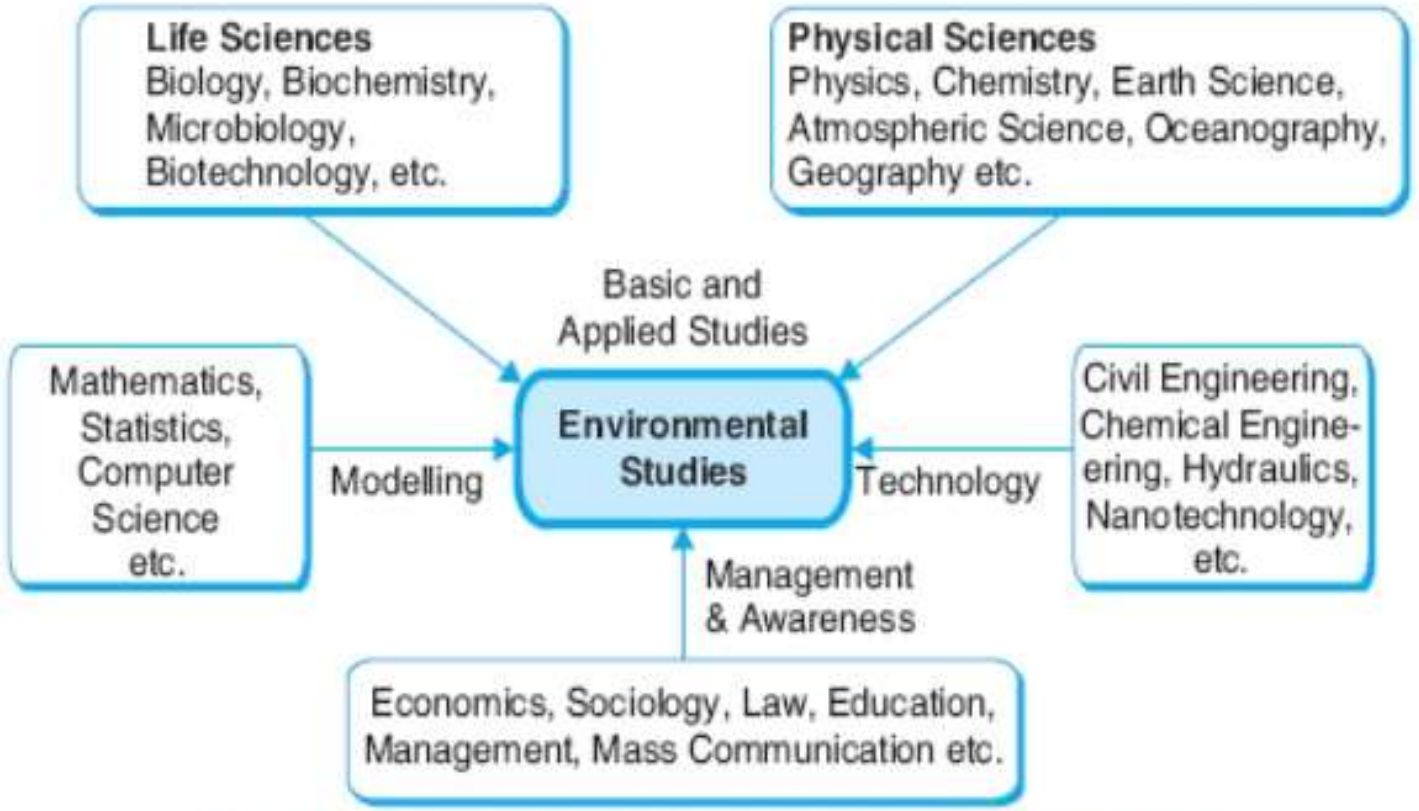


Fig 1.2 Multidisciplinary nature of environmental studies.

Objectives of Environmental Studies

According to UNESCO (1971), the objectives of environmental studies are:

a) Creating the awareness about environmental problems among people and students.

b) Imparting basic knowledge about the environment and its related problems.

c) Developing an attitude of concern for the environment.

d) Motivating public to participate in environment protection and environment improvement.

e) Acquiring skills to help the concerned individuals in identifying and solving environmental problems.

f) Striving to attain harmony with Nature.

Guiding principles of environmental education

According to UNESCO, the guiding principles of environmental education should be as follows:

(a) Environmental education should be compulsory, right from the primary up to the post graduate stage.

(b) Environmental education should have an interdisciplinary approach by including physical, chemical, biological as well as socio-cultural aspects of the environment. It should build a bridge between biology and technology.

(c) Environmental education should take into account the historical perspective, the current and the potential historical issues.

(d) Environmental education should emphasize the importance of sustainable development i.e., economic development without degrading the environment without comprising for the future generation.

(e) Environmental education should emphasize the necessity of seeking international cooperation in environmental planning.

(f) Environmental education should lay more stress on practical activities and first hand experiences.

The disciplines included the following science and engineering principle.

(a) Environmental Science:

- It is the scientific study of the environmental system particularly adoptation and interaction of biotic component with the abiotic components (air, water, soil and land, temp, light), of the Environment with a focus on environmental pollution and degradation.

(b) Environmental Engineering:

- It deals with the study of technical processes involved in the protection of environment from the potentially deleterious effects of human activity and improving the environmental quality for the health and well beings of humans.

(c) Environmental Management:

- It promotes due regard for physical, social and economic environment of the enterprise or projects. It encourages planned investment at the start of the production chain rather than forced investment in cleaning up at the end.
- It generally covers the areas as environment and enterprise objectives, scope, and structure of the environment, interaction of nature, society and the enterprise, environment impact assessment, economics of pollution, prevention, environmental management standards etc.

Scope of environmental studies

Environmental studies discipline has multiple and multilevel scopes

- The study Natural resources their conservation and efficient management.
- It provides the knowledge about ecological systems and Biodiversity
- It provides necessary information about biodiversity richness and the potential dangers to the species of plants, animals and microorganisms in the environment.
- The study enables one to understand the causes and consequences due to natural and main induced disasters (flood, earthquake, landslide, cyclones etc.,).
- Sources of environmental pollutions and control measures
- It enables one to evaluate alternative responses to environmental issues before deciding an alternative course of action.

Scope of environmental studies

- The study enables to know the environmental acts, rights, rules, legislations, etc.) to make appropriate judgments and decisions for the protection and improvement of the earth.
- The study exposes the problems of over population, health, hygiene, etc.
- Social issues in relation to development and Environment
- Research and Development to monitor and controlling technology to solve various environmental issues.
- It teaches the citizens the need for sustainable utilization of resources
- Human population and Environment
- Environmental journalism: To generates awareness among people regarding environmental issues

Through Mass media

- Mass media as news papers, magazines, radios, t v etc., can play an important role in educating the masses regarding environmental problems and issues.
- Through organizing seminars and conferences, organizing meeting seminars, and conferences at various levels help in spreading environmental information to general public.
- Awareness can also be spread by organizing various competitions on environmental problems, non conventional energy sources etc., such competitions may also help in disseminating information regarding various environmental issues.

Importance of Environmental Study

1) Environmental studies helps maintain ecological balance by providing a basic operating knowledge of environmental system and processes.
2) It gives information regarding the changes that takes place due to anthropogenic factors and helps gain skills of analysing various environmental system and the effect of human activities on them.
3) Environmental studies help to achieve sustainable development and understand the relationship between development and the environment.
4) This discipline helps to educate people regarding their duties towards environmental protection.

Importance of Environmental study

5)Environment is one subject that is actually global in nature.

6) Environmental study deals with the analysis of the processes in water, air, land, soil, and organism which leads to pollution (or) environment degradation.

7) It also deals with the most important issues like safe and clean drinking water, hygienic living conditions, clean and fresh air, healthy food for man and for development.

8) The discipline provides us with basic knowledge of the environment and various environmental issues. It examines the scientific basic for environmental and social concerns about our present energy needs, global climate changes, toxic emission and waste disposal.

Importance of Environmental study

9) It also provide knowledge about the development and utilisation of energy resources and the role of public policy there in.

10) Environmental law, business administration and environmental engineering are emerging as new career opportunities for environment protection and management.

Importance of Environmental study

11)Environmental studies also aims to protect bio diversity growth in human population and the resulting increase in material consumption and technological development have increased the rate and scale of degradation of the environment.

12) The concepts from environmental studies can be applied to the study of agriculture and the design of sustainable production system.

13) With the pollution control laws becoming more strengthen, are finding it difficult to dispose off the produced wastes.

Environment and its segments

Environment consists of four segments.

1. Atmosphere: Blanket of gases surrounding the earth.
2. Hydrosphere: Various water bodies present on the earth.
3. Lithosphere: Contains various types of soils and rocks on the earth.
4. Biosphere: Composed of all living organisms and their interactions with the environment.

Atmosphere:

The following points highlight the vital role played by atmosphere in the survival of life in this planet.

- The atmosphere is the protective blanket of gases which is surrounding the earth. It protects the earth from the hostile environment of outer space.
- It absorbs IR radiations emitted by the sun and reemitted from the earth and thus controls the temperature of the earth
- It allows transmission of signicant amounts of radiation only in the regions of 300 { 2500 nm (near UV, Visible, and near IR) and 0.01 { 40 meters (radio waves). i.e it lters tissue damaging UV radiation below 300 nm.
- It acts as a source for CO_2 for plant photosynthesis and O2 for respiration
- It acts as a source for N_2 for nitrogen xing bacteria and ammonia producing plants.

The atmosphere transports water from ocean to land.

Hydrosphere:

- The hydrosphere is a collective term given to all dierent forms of water.
- It includes all types of water resources such as oceans, seas, rivers, lakes,
- streams, reservoirs, glaciers and ground waters.
- It covers more than 75 % of the earth surface.

Lithosphere: The earth is divided in to layers.

- Crust: The crust is the earth's outer skin that is accessible to human.
- The crust consists of rocks and soil of which the latter is the important part of lithosphere.
- Mantle: It is the middle layer of the earth and is made up of dierent types of rocks (Igneous, sedimentary and metamorphic)
- Core: It is the innermost geological layer of the Earth. It is primarily asolid ball of rocks and minerals.
- The lithosphere consists of upper mantle and the crust.
- **Biosphere:**
- The biosphere or ecosphere is a global ecosystem composed of living organisms (biota) and the abiotic (nonliving) factors from which they derive energy and nutrients.
- It extends from 2 kilometres into the atmosphere t

Vertical structure of atmosphere

- Troposphere
- The bottom layer of the atmosphere that stretches about 11 Km
- Contains 75 % of the air
- Temperature decreases with altitude
- Storms and rainfall take place
- Made up of mostly N_2 & O_2

Stratosphere

- The second layer of the atmosphere that extends up to 50km.
- Contains 24 % of the air
- Temperature increases with altitude
- Contains ozone (O_3) layer that protects us from harmful ultraviolet rays

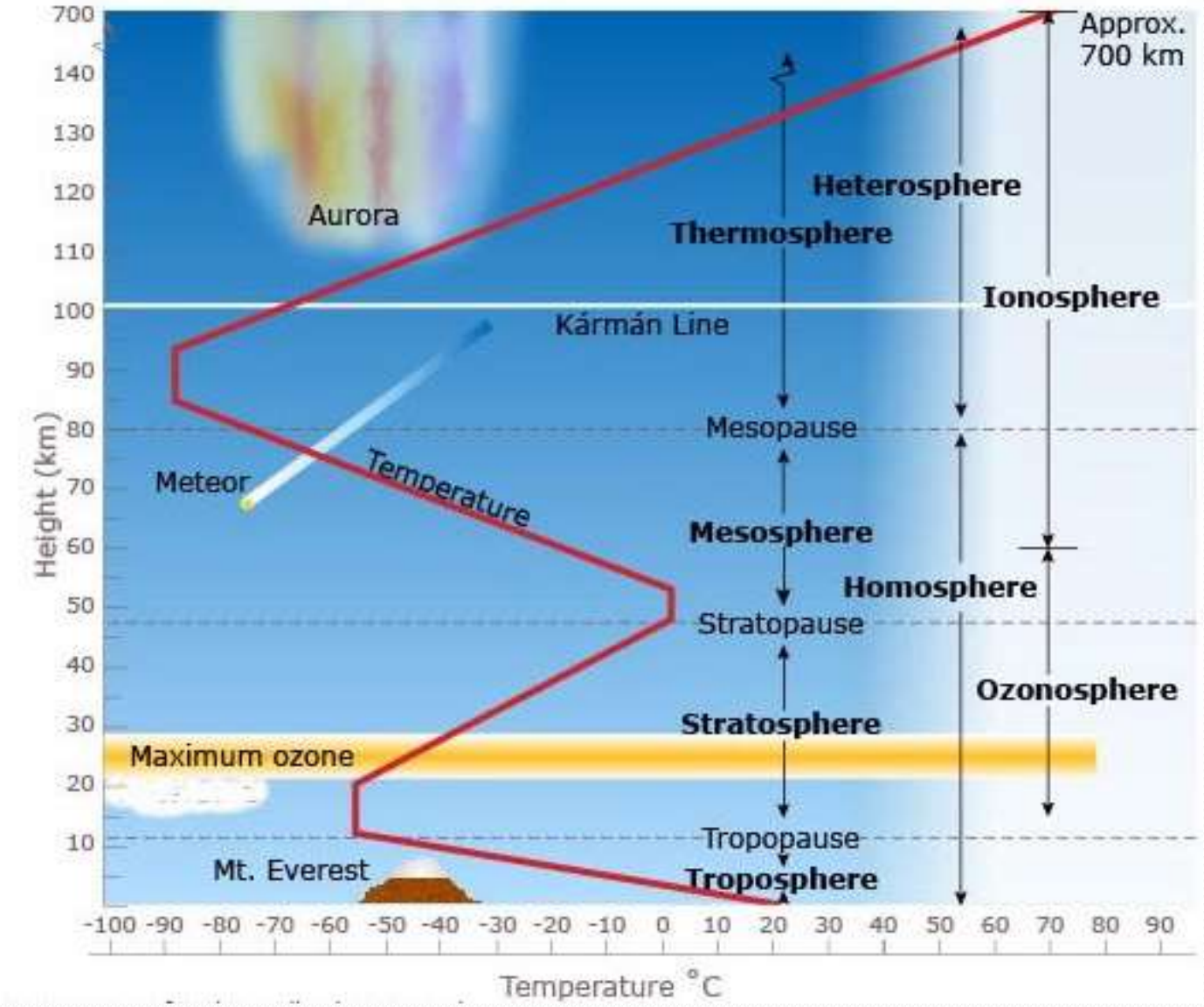
Mesosphere

- The third layer of the atmosphere that extends up to 80 km.
- Temperature decreases with altitude
- The coldest layer
- Here most meteors burn up

Thermosphere (ionosphere and exosphere)

- The fourth layer of the atmosphere that stretches about 1000 km.
- The hottest layer due to the ions (H+ and He) that directly absorb the sun's radiation
- Temperature increases with altitude
- Where radio waves are reflected.

Vertical structure of atmosphere




Thank you!