

Pre-requisites: Environmental studies

Learning objectives:

- To identify the pollutants and their sources and then the transport mechanisms of the pollutants followed by the affected population and respective controls.
- To learn the techniques and instrumentation of ambient air monitoring,
- Establishment of ambient air monitoring stations, stacks monitoring.
- To know the methods of analysis air and air pollutants.

Course outcomes:

After the exposure to the subject, student is able to:

1. Understand of contemporary pollution issues.
2. Analyze specific examples of various sources of air pollution.
3. Comprehend the causes and effects of key types of air pollution.
4. Classify of different pollution control strategies
5. Assess the air sampling methods for safe air quality management

UNIT - I

AIR POLLUTION

Air pollution - definitions-scope, significance - air pollutants - measurements of pollution classification –natural and artificial-primary and secondary, point and non-point.

EFFECT OF AIR POLLUTION

Effect of air pollutants on man-material and vegetation-global effects of air pollution green house effect, heat lands, acid rains and ozone.

UNIT-II

METEOROLOGY AND PLUME DISPERSION

Properties of atmosphere-heat, pressure, wind forces, moisture and relative humidity influence of meteorological phenomenon on air quality- wind rose diagram.

LAPSE RATE

Lapse rate, pressure systems, wind and moistures, inversions and plume behavior plume rise models-Gaussian model for plume dispersion.

UNIT-III

METHODS OF CONTROLLING

Control of particulates-control at sources-controlling equipments-settling chamber centrifugal separators-fabric filters –dry and wet scrubbers-electrostatic precipitators.

GASEOUS POLLUTANTS

General Methods of Controlling Gaseous Emission-adsorption-absorption-combustion condensation-SO_x control- NO_x control-technologies

UNIT-IV

INPLANT CONTROL MEASURES

Process Change-Dry and Wet Methods of Removal and Recycling-Dust Collection Devices-Internal Separators-Catalyst Reduction

AIR POLLUTION CONTROL BY DILUTION

General-Meteorological Factors-Atmospheric Temperature Lapse Rate-Speed and Direction of Wind- Wind Velocity Profile-Diffusion Theories-Objects of Stack

UNIT-V

SAMPLING AT SOURCE

Flue Gases-Emission Standards-Gaseous Sampling- Proportional Sampling-Sampling Point Size-IsoKinetic Conditions-Sample Recovery Tests.

AIR QUALITY MANAGEMENT

Air Quality Management-Monitoring Of Suspended Particulate Matter, Sulphur Oxide, NO and Carbon Monoxide

Learning resources:

Text books:

1. Air Pollution and Control by Rao, M.N and Rao, H.N., Tata McGraw Hill, New Delhi, 2007.
2. Environmental Engineering and Management, (2nd Edition) by Suresh, S.K.Kartarai & Sons, 2005.

Reference books:

1. An Introduction to Air pollution by Trivedy, R.K., B.S.Publications, 2005.
2. Air pollution by Wark and Warner, Addison-Wesley Publications, 1998.

e-learning resources:

NPTEL