

### 3/4 B.Tech. FIFTH SEMESTER

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#### AIR POLLUTION AND CONTROL (FREE ELECTIVE B)

Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

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#### Objectives:

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- 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, stack monitoring.
- To know the methods of analysis air and air pollutants.

#### Learning outcomes:

After the exposure to the subject, student will have:

- Understanding of contemporary pollution issues.
- Insight into specific examples of air pollution.
- Knowledge of the causes and effects of key types of air pollution.
- Understanding of different pollution control strategies

#### 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.

#### UNIT-II

##### 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 – III

##### METROLOGY AND PLUME DISPERSION:

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

#### UNIT-IV

##### LAPSE RATE:

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

#### UNIT-V

##### METHODS OF CONTROLLING:

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

#### UNIT-VI

##### GASEOUS POLLUTANTS:

General Methods of Controlling Gaseous Emission-adsorption-absorption-combustion-condensation-SOXcontrol- NOX control-technologies

#### **UNIT-VII:**

##### **THERMODYNAMICS AND KINETICS OF AIR POLLUTION:**

Applications in the removal of gases like SO<sub>2</sub>, NO<sub>2</sub>, CO and HC-Air fuel ratio-computation and control of products of combustion.

#### **UNIT-VIII**

##### **AIR QUALITY MANAGEMENT:**

Air quality management-monitoring of SPM, SO, NO and CO,-Stack monitoring for flue gases-emission standards.

#### **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, I. 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.

**Web Reference books:** NPTEL