**19CE41E3 – AIR POLLUTION AND CONTROL**

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| **Course Category** | Professional Elective | **Credits:** | 3 |
| **Course Type**  | Theory | **Lecture - Tutorial - Practical**  | 3 - 0 - 0 |
| **Prerequisite**  | None | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks**  | 100 |

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| **Course Objectives** | 1. To classify various sources of air pollution and emission standards.
2. To illustrate the effects on human beings, materials and vegetation and analysis of pollutants.
3. To determine quantity of air pollution.
4. To adapt processes, approaches, and devices used to control air pollution.
5. To demonstrate control mechanisms of gaseous pollutants.
6. To explain about standards, monitoring and indices of air quality with case studies.
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| **Course Outcomes** | CO1 | Discuss the concepts of air pollution and assess the sources. |
| CO2 | Estimate the effects of air pollutants on human beings, materials and vegetation. |
| CO3 | Estimate the quantity of air pollution. |
| CO4 | Develop the control technologies for particulate pollutants. |
| CO5 | Develop the control technologies for gaseous pollutants. |
| CO6 | Relate the fundamental concept of air quality management with sustainable development of our community. |
| **Course****Content** | **UNIT I****INTRODUCTION:****AIR POLLUTION:** Definition of Air Pollution - Sources & Classification, Source inventory of Air Pollutants - Air Quality and Emission standards - Sampling of Pollutants in ambient air - Stack sampling.**UNIT II****EFFECTS OF AIR POLLUTANTS:** Effects of air pollution on human beings, materials, vegetation, animals – global warming – ozone layer depletion – Sampling and Analysis – Basic Principles of Sampling – Source and ambient sampling – Analysis of pollutants – Principles.**UNIT III****METEOROLOGY AND AIR POLLUTION:** Elements of atmosphere- Factors influencing air pollution, Wind rose, Mixing Depths, Lapse rates and dispersion - Atmospheric stability, Plume rise and dispersion.**UNIT IV****CONTROL OF PARTICULATE POLLUTANTS:** Properties of particulate pollution - Particle size distribution - Control mechanism - Dust removal equipment –working principle and operation of settling chambers, cyclones, wet dust scrubbers, fabric filters and Electro Static Precipitator. **UNIT V****CONTROL OF GASEOUS POLLUTANTS:** Process and equipment for the removal of pollutants by chemical methods - Design and operation of absorption and adsorption equipment - Combustion and condensation equipment. **UNIT VI****AIR QUALITY MANAGEMENT**Air quality standards – Air quality monitoring – Preventive measures - Air pollution control efforts – Zoning – Town planning regulation of new industries – Legislation and enforcement – Environmental impact assessment and Air quality. |
| **Textbooks****and****References** | **TEXT BOOKS:**1. D. Anjaneyulu, *Air Pollution and Control Technologies*, Allied Publishers, 2nd edition, reprint in 2020.
2. C.S. Rao, *Environmental Pollution Control Engineering*, Wiley Eastern Ltd., 3rd edition, 2018.
3. M.N. Rao, and H. V. N. Rao, *Air Pollution Control*, Tata-McGraw-Hill Publication, 1st edition, 2017.

**REFERENCES**1. W. L. Heumann, *Industrial Air Pollution Control Systems*, McGraw-Hill, 1997.
2. S. P Mahajan, *Pollution Control in Process Industries*, Tata McGraw-Hill Publishing Company, 1991.
3. S.W Peavy, D.R. Rowe and G. Tchobanoglous, *Environmental Engineering*, McGraw Hill, 1985.
4. A.C. Stern, *Fundamentals of Air Pollution*, Academic Press, 1984.
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**CO-PO Mapping:** 3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | 1 | - | - | 1 | - | 3 | - | - | - | - | - | - |
| **CO2** | 2 | 1 | - | 1 | 1 | 3 | - | 1 | 2 | - | - | 1 |
| **CO3** | 3 | 3 | - | 1 | 1 | - | - | - | - | - | 1 | 1 |
| **CO4** | 2 | 2 | 3 | 3 | 3 | 1 | 2 | - | - | - | 2 | 1 |
| **CO5** | 2 | 2 | 3 | 3 | 3 | 1 | 2 | - | - | - | 2 | 1 |
| **CO6** | 1 | 1 | - | 1 | 2 | 2 | 1 | 1 | - | - | - | - |