

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE5015 - Environmental Monitoring and Data Analysis

Credit Distribution: C:9 L:3 T:0 P:0 E:0 O:6 TH:0

Course Type: Theory

Description: To introduce the students to the basic principles, methods and instrumentation used in air, water Wastewater, soil, sludge and solid waste monitoring. To demonstrate applications of statistical methods in the environmental data analysis through case studies.

Course Content: Introduction to environmental monitoring, environmental quality parameters and their quantification, elements of sampling systems for gaseous, liquid and solid pollutants, types of sampling systems, concepts and principles of measurement, instruments used for measurement of gaseous, liquid and solid pollutants, stationary and mobile monitoring networks, design of monitoring networks, monitoring of meteorological parameters, spatial data analysis, remote sensing and geographical information system application in environmental monitoring, quality control and quality assurance. Introduction to statistics in environmental monitoring, data quality objectives, data management, types of data acquisition systems, sample size and confidence intervals, correlation and regression, time series analysis, multivariate analysis, statistical tests, errors and uncertainty analysis, environmental indices case studies for environmental data analysis.

Text Books

- Artiola, J.F., Pepper, I.L., and Brusseau, M.L. (2004) Environmental monitoring and characterization, Elsevier Academic Press.
- Richard O Gilbert (1987). Statistical methods for environmental pollution monitoring, John Wiley & Sons.

Reference Books

- Boubel, R.W., Fox, D.L., Turner, D.B. and Stern, A.C., 1994. Fundamentals of Air Pollution, 3rd Edition, Academic Press, New York. Bryan F.J. Manly, 2001.
- Statistics for Environmental Science and Management, Chapman and HallHinds,W., 1999.
- Aerosol Technology: Properties, Behavior, and Measurement of Airborne Particles: Properties, Behavior and Measurement of Airborne Particles. Wiley. Hugh W. Coleman, W. Glenn Steele, 1999
- Experimentation and uncertainty analysis for engineers, Wiley. MetCalf and Eddy.,1991.
- Wastewater Engineering, Treatment, Disposal and Reuse. 3rd Edition, Tata McGraw Hill, New Delhi.
- Peavy, H.S., Rowe, D.R., Tchobanoglous, G. Environmental Engineering, 1985.
- McGraw Hill International Editions, New York.Sawyer, C.L., McCarthy, P.L. and Parkin, G. F.,1994. Chemistry for Environmental Engineering
- McGraw Hill International Editions, New York.Seinfeld, S. N., and Pandis, J. H., 2005. Atmospheric Chemistry and Physics; from air pollution to climate change.

- Wiley-Inter Science Standard Methods for the Examination of Water and Waste Water, 1995. 20th Edition, APHA.

Prerequisite: NIL