

Urban Air Quality Assessment, Modelling, and Management

Overview

Mathematical models are used in all aspects of urban air quality management where prediction is a major component i.e. from event forecasting to long term planning. With the rapid advancement in computational technology, mathematical models are being widely used in decision making. Models can be used in several ways namely for (i) conceptualization, (ii) problem solving, (iii) setting up design parameters, and (iiiv) advanced research leading to applications.

There are three broad approaches used in modelling of air quality - deterministic, statistical and physical. In deterministic modelling approach the problems are solved using a set of differential equations which represent the relevant physical processes. Statistical modelling approaches are empirical; they vary from simple contingency tables through regression, time series, and hybrid techniques. In physical modelling approaches, a real time process is simulated on a reduced scale in the laboratory.

The models address the micrometeorological processes occurring in the urban atmosphere. The course will include the explanation of specific urban phenomena, such as urban heat island (UHI), inversion situations and urban ventilation paths. General concepts are discussed, e.g. urban canopy layer and urban boundary layer, and also the case study of "Delhi pollution" for air pollution analysis and mitigation.

Course Information	Lectures and tutorials: 25 to 29 September, 2023 Discussion of assignments: afternoon session on first day Examination: final day Number of participants for the course will be limited to forty (40).
You Should Attend If...	<ul style="list-style-type: none">▪ Undergraduate or a Post-graduate student of Civil, Chemical and mechanical engineering and Atmospheric Sciences▪ Professionals from research organizations, industries, consultancy firms.▪ Faculty from recognized engineering colleges and universities
Fees	Course Registration Fee: Participants from abroad : US \$ 500 Students : INR 1000 Faculty : INR 5000 Industry / Research Organizations : INR 30000 Government Organizations : INR 10000 The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. Modes of payment: <u>Online transfer:</u> Click here to pay: https://elearn.nptel.ac.in/gian/
Accommodation	The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel/
Registration Procedure	Please follow the following steps for the registration: <ol style="list-style-type: none">1. Go to GIAN website (http://www.gian.iitkgp.ac.in/GREGN/index) First time users need to register and pay a one-time fee of INR 500 /2. Enroll for the course: Metocean Science and Engineering. Once you enroll for the course, an Enrollment/Application number will be generated, and the course coordinators will be notified.

The Faculty



Dr. Uwe Schlink is a Senior Researcher at the Helmholtz Centre for Environmental Research in Leipzig, Germany, and Professor at University of Leipzig, Institute of Meteorology. He is heading the Air Quality Research Group in the Department of Urban and Environmental Sociology. His research areas include urban climate research, urban air quality, personal exposure, and vulnerability with extreme environmental situations in urban areas, statistical modelling and Bayesian inference. He has published more than 60 articles in peer-reviewed international journals. He is an adjunct faculty of the IITM in Chennai and a fellow of the Institute of Advanced Studies at Durham University, UK.



Dr. Shiva Nagendra, SM is Professor in the Department of Civil Engineering, Indian Institute of Technology Madras, Chennai. He is the Vice-Chairman GATE, JAM 2023, IIT Madras. He has more than 24 years' experience in research, teaching, industry consultation and community development. He has published more than 100 research publications peer-reviewed journals, two reference books, more than 100 papers in conferences and three patents. He is founder-chairman of Indian International Conference on Air Quality Management (IICAQM) series and founder-president of Air Quality Management Association (AQMA). He is WHO subject matter expert in a global technical consultation on the transmission of respiratory pathogens through the air. He also is a professional member of several technical institutions and organizations of India including the Society for Indoor Environment (SIE).

Course Co-ordinator

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