

NPTEL Syllabus Template

Course Title	Indoor Air Pollution: sources, effects, monitoring, control and modeling
Discipline	Environmental Engineering; Civil Engineering; Chemical Engineering; Mechanical Engineering
Duration of course 4/8/12 weeks (10/20/30 hours @2.5 hrs/week)	12 weeks
Number of times you have taught this course totally and in the last 5 years (2-3 times is preferable, if not more)	3
Is this course syllabus approved by AICTE or by Senate in your/any institute? If yes, please give the course name and institute under which this is approved.	Institute: IIT Hyderabad Course Name: Indoor Air Pollution
The time frame of when you would want to offer the course: (Jan 2024/July 2024)	Jan 2024
Will it map to any course in the AICTE model curriculum? LINK to AICTE Curriculum LINK 1 LINK 2 LINK 3 LINK 4	
Will it map onto any of the NPTEL domain? LINK to Domain page: https://nptel.ac.in/noc/Domain/	Environment

Name of the Instructor(s)	Asif Qureshi	
Department	Department of Civil Engineering; Department of Climate Change	
Institute	IIT Hyderabad	
Email ID	asif@ce.iith.ac.in	
Mobile Phone Number	777 183 2680	
Website of Instructor	asifqureshi.wordpress.com	

Intended audience	<ol style="list-style-type: none"> 1. Students (PG and senior UG). 2. Working professionals in field of environmental engineering and air pollution, and its control. 3. Junior scientists and engineers of pollution control boards. 4. Non-engineering background executives of private industries dealing with air pollution and its control. 5. Non-engineering background executives from governmental agencies such as pollution control boards and other state/national bodies, those who are dealing with or are interested in air pollution and its control. 6. Senior level scientists 7. Regulators and policy makers from ministry and other professional and governmental bodies.
Is it a core/elective course?	Core
Is it a UG/PG/PhD level course?	PG
Is this course relevant for GATE exam preparation?	Yes
Which degrees would it apply to? (BE/ME/MS/BSc/MSc/PhD etc)	PhD, ME, MSc, MS, BE, BSc
What are the next set of courses that can be taken by students who complete this?	Advanced air pollution engineering, Indoor air pollution and health, Sick Building Syndrome Analysis.
Pre-requisites in terms of educational qualification of participants, or if any other courses should be done before this course can be taken	Basic physics, chemistry, mathematics (class 10 to 12 level)
Industry recognition of this course – List of companies/industry that will recognize/value this online course	Public sector power units Iron & Steel, and other manufacturing industries Mining sector
Will the final certification exam be– paper/pen type or computer based - both are proctored	Paper/Pen
Will the course require use of any software such as MATLAB or any programming language, etc. or any other tool? If yes, does it have a Linux based compiler available or if licensed, can we get the educational license for the same?	No

<p>Names of 2 reviewers for the course (can be from other institutes – will be used if we need any additional inputs on the course) – Name, Dept, email id, Institute</p>	<p>Name : Prof. Harish Phuleria Dept. : Environmental Science & Engineering Institute : IIT Bombay Email : phuleria@iitb.ac.in</p> <p>Name : Prof. Purnendu Bose Dept. : Civil Engineering Institute : IIT Kanpur Email : pbose@iitk.ac.in</p>
<p>List of reference materials/books</p>	<ol style="list-style-type: none"> 1. Indoor Air Pollution: Issues in Environmental Science & Technology Eds: R.M. Harrison, and R.E. Hester RSC Press, 2019. ISBN: 978-1-78801-514-1 2. Indoor Air Pollution and Health - A Health Perspective P. Kulshreshtha and M. Khare VDM Verlag, 2010. ISBN: 978-3-639-26093-9 3. Indoor Air Quality in Naturally Ventilated Schools R. Goyal and M. Khare VDM Verlag, 2010. ISBN: 978-3-639-25234-7 4. Indoor Air Pollution Editors: P Pluschke, H Schleichinger Springer-Verlag GmbH Germany 2018. ISBN (hardcover): 978-3-662-56063-1 5. Indoor Air Pollution Control Thad Godish CRC Press, 2017. ISBN: 978-1315894386

FOR GETTING THE INTRODUCTORY COURSE PAGE READY – TO OPEN FOR ENROLLMENTS

1. Introduce the course in about 4-5 lines

Air pollution is a very serious problem. While most courses target outdoor air pollution, this course will focus on Indoor Air Pollution, a very important current topic. Course will cover the types of indoor air pollutants, sources of these pollutants, their effects, measures for control, and indoor air quality modeling.

2. Photograph of instructor(s)



3. About the instructor(s)

Asif Qureshi is an Associate Professor at IIT Hyderabad. He has D.Sc. in Environmental Science from the Swiss Federal Institute of Technology (ETH) Zürich, Masters in Environmental Engineering from the University of British Columbia, Canada, and B.Tech. in Civil Engineering from IIT Kanpur. He works on different aspects of environmental pollution and health. In particular, he is interested in chemical, and biological, pollution and associated impacts to humans and environment in the present and the future. Scientific methods are used to provide information that may help inform decision and policy making.

4. An introductory video about the course (2-5 minutes' duration)

Weekly Course Plan			
Weeks		Lecture Names	Assignments
Week 1	:	Indoor air pollutants, sources and causes: Homes / Residential Environment (cooking, cleaning, occupancy, etc.); offices and schools, other commercial establishments such as saloons, fitness centers and restaurants.	Offline
Week 2	:	Outdoor air as source to indoor air: physical and chemical processes, inflow of gas and particles, exfiltration, ventilation and ventilation systems. Mechanisms of the infiltration of outdoor pollutants.	Offline
Week 3	:	Effects of indoor air pollution; Sick building Syndrome; Case studies.	Offline
Week 4	:	Chemical kinetics: collision theory, rates of reactions. Important chemical reactions in indoor air. Difference from outdoor air. Reactions on surfaces.	Offline
Week 5	:	Bioaerosol/Biological particles in indoor atmosphere. Properties and sinks. Environmental factors controlling bioaerosol concentrations (e.g., relative humidity, temperature, ventilation, occupancy).	Offline
Week 6	:	Constructing and solving of simple mass balance models of indoor air pollution. Understanding fate using concepts of half-lives and persistence/residence times. Introduction to CONTAM, a free software on indoor air quality and ventilation analysis.	Offline
Week 7	:	Indoor and outdoor air as contributor to human exposure. Method/Models for human exposure (e.g. using time-activity information) and risk assessment.	Offline
Week 8	:	Indoor air pollution monitoring (physic-chemical): sampling and analysis methods, and instrumentations.	Offline
Week 9	:	Indoor air pollution monitoring (biological): sampling and analysis methods, and instrumentations.	Offline
Week 10	:	Indoor air pollution/quality in the Indian context. Information on indoor air pollution by habitat, locations. Key messages and gaps.	Offline
Week 11	:	Indoor air quality guidelines and standards for controlling factors (e.g. ventilation, temperature) as per various agencies such as WHO, OSHA, EPA.	Offline

Week 12	:	Indoor air pollution control methods. Practices and case studies.	Offline
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TA Details			
	:	Teaching Assistant 1	Teaching Assistant 2
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Currently pursuing degree	:	PhD	PhD