

VISION



“To be at the forefront of technological research and innovations in environmental science and engineering and to contribute to the nation”

The Environmental Science and Engineering Department (ESED) was established in 1985 as a centre for Environmental science and Engineering, and recently in February 2019 got the department status. Prior to this, an "Environmental Science and Engineering Group" comprising of faculty members from various allied disciplines existed on campus since 1977. ESED currently has a dedicated group of 16 faculty members with multi-disciplinary background and interests. The graduate program offered by this department prepares individuals for careers as engineers and scientists in Environmental Quality & Pollution Control. This program offers course work and research opportunities leading to the masters and doctoral degrees and ultimately enable our graduates to contribute to the solution of current and future environmental problems. Since the beginning, the Department has established and maintained strong links with leading industries, institutions and national and international funding agencies. Research projects are currently funded by renowned agencies such CIAR (Centre for Indoor Air Research, USA), DST (Department of Science and Technology), AERB (Atomic Energy Regulatory Board) and MOEFCC (Ministry of Environment, Forest and Climate Change).

ACADEMIC PROGRAMMES

Ph.D.

Aim: To create researchers with strong fundamentals and aptitude to solve an array of environmental related issues

Duration: 3-6 years

Admission: May & Dec; Academic Record and Interview/Written Test

M.Sc.- Ph.D.

Aim: To impart Science graduates with strong fundamentals and develop a research aptitude for addressing challenging environmental problems

Duration: 5+ years

Admission: Summer; JAM Score and/or Interview/Written Test

M.Tech.

Aim: To enhance the fundamental engineering education with research exposure of an individual for a successful career in Environmental Engineering

Duration: 2 years

Admission: May; GATE Score and/or Interview/Written Test

B.Tech. - M.Tech. (Dual Degree)

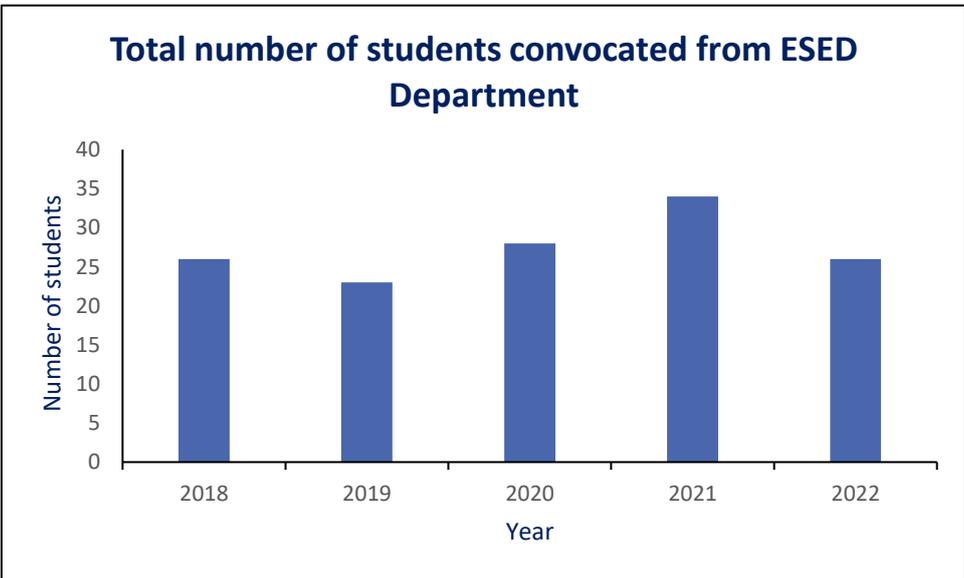
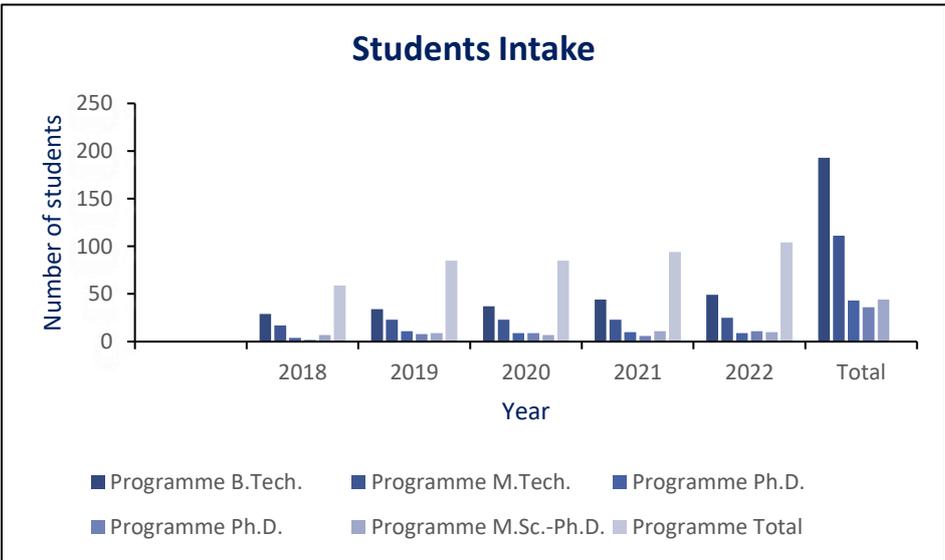
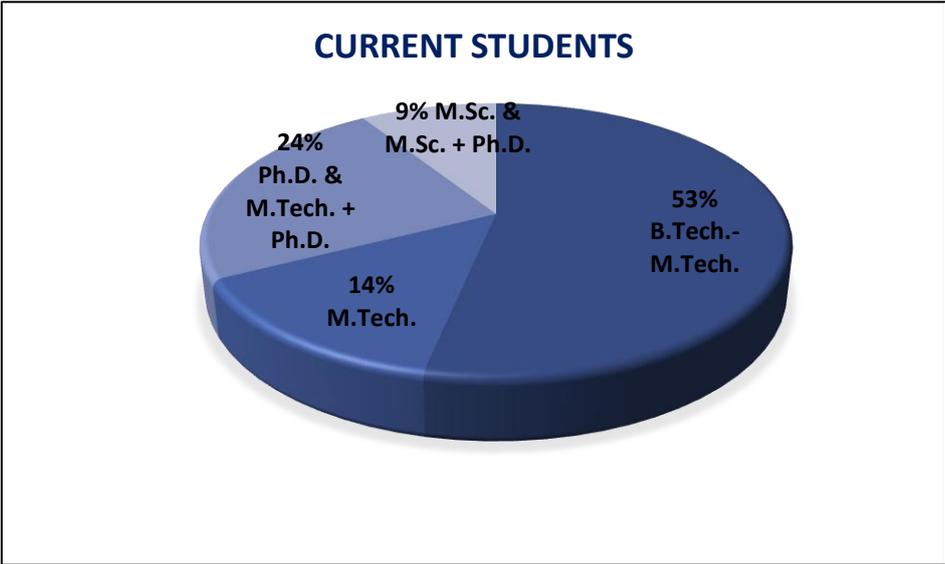
Aim: To develop the analytical tools of environmental engineering.

Duration: 5 years

Admission: Summer: Through JEE

Minor

Undergraduates from other departments at IITB can take courses offered as Minor by the Department to earn a Minor degree in Environmental Science and Engineering. This is in addition to their Major degree. The aim is to provide a wide exposure to the students.



COURSES

Solid Waste

- Municipal Solid and Biomedical Waste Management
- Hazardous Waste Management

Chemistry

- Environmental Chemistry
- Environmental Chemistry Lab

Biology

- Environmental Biotechnology
- Design of Biological Treatment Systems
- Biological Treatment Processes
- Environmental Microbiology and Ecology
- Environmental Toxicology and Health
- Bioremediation - Principles and Applications
- Environmental Microbiology Laboratory

Management

- Environmental Impact Assessment
- Introduction to Risk Analysis
- Energy Conversion and Environment
- Environmental Management
- Environmental Law and Policy
- Environmental Change and Sustainable Development
- Environmental Ethics
- GIS for Environmental Planning and Management
- Industrial Wastewater Management and Reuse
- Environmental Studies: Science and Engineering (UG Course)
- Environmental Science and Engineering (PG Elective)

Water

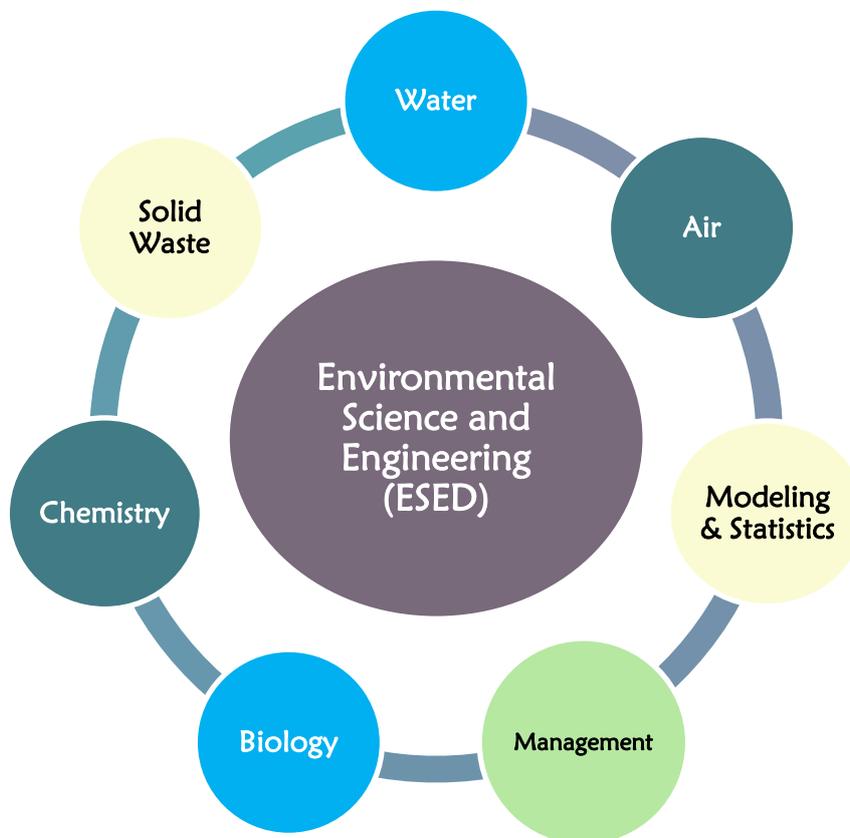
- Water Resources and Open Channel Flow
- Design of Wastewater Treatment Systems
- Physico-Chemical Treatment Technologies
- Municipal Water and Wastewater Systems
- Groundwater Flow & Contaminant Transport through Porous Media
- Design of Water and Wastewater Systems
- Introduction to Fluid Mechanics
- Environmental Monitoring Laboratory
- Water and Wastewater Engineering

Modelling & Statistics

- Mass Transfer Process in Environmental Systems
- Environmental Systems Modeling
- Environmental Statistics and Experiment Design
- Environmental Statistics
- Environmental Computational Laboratory

Air

- Design of Air Pollution Control Systems
- Air Pollution Science and Engineering
- Air Pollution Control Technologies
- Aerosol Science and Engineering
- Air Pollution Monitoring Laboratory



FACULTY



Prof. Abhishek Chakraborty

Research Area:

- Air pollution control and monitoring (Aerosol)
- Physicochemical characterization of aerosols
- Atmospheric processing of organic aerosols

Email ID: abhishekc@iitb.ac.in



Prof. Amritanshu Shrivastav

Research Area:

- Water and Wastewater Treatment
- Advanced Oxidation Processes
- Visible Light Photocatalysis
- Microplastics

Email ID: amritan@iitb.ac.in



Prof. Anil Kumar Dikshit

Research Area:

- Water Supply and Water & Wastewater Treatment
- Environmental Systems Modelling, Optimization, Management & Sustainability
- Industrial Effluent and Sludge Management
- GIS for Environment Planning & Simulation

Email ID: dikshit@iitb.ac.in



Prof. Anurag Garg

Research Area:

- Municipal solid waste and wastewater treatment
- Waste recycling and resource recovery
- Energy from waste and Restoration of old dumpsite

Email ID: a.garg@iitb.ac.in



Prof. Harish Phuleria

Research Area:

- Environmental health and risk assessment
- Modelling effect of air pollution
- Atmospheric aerosols

Email ID: phuleria@iitb.ac.in



Prof. Manoranjan Sahu

Research Area:

- Air Pollution Control Technology
- Aerosol and Air Quality (Source apportionment, low-cost sensor, satellite data, forecasting)
- Data Science Application in Environmental Engineering
- Nanomaterial Synthesis and its Applications
- Process development and Technology Scale-up
- CO₂ Capture

Email ID: mrsahu@iitb.ac.in

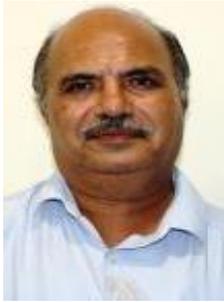


Prof. Munish Kumar Chandel

Research Area:

- Carbon capture/Storage
- Solid waste management
- Waste to energy
- Fluidized bed combustion
- Greenhouse gas mitigation
- Chemical looping combustion

Email ID: munish.chandel@iitb.ac.in



Prof. Sanjeev Chaudhari

Research Area:

- Arsenic, Fluoride, and Uranium removal from groundwater
- Biological nutrient removal from wastewater
- Application of natural coagulants for water and wastewater treatment

Email ID: sanjeev@iitb.ac.in



Prof. Shyam Asolekar

Research Area:

- Air pollution control technologies
- Environmental policy and management
- Recycle and reuse of effluents
- Treatment of leachates and special industrial wastewaters

Email ID: asolekar@iitb.ac.in



Prof. Srinidhi Balasubramanian

Research Area:

- Air quality
- Reactive nitrogen
- Sustainability of food and fuel systems

Email ID: srinidhi@iitb.ac.in



Prof. Subhankar Karmakar

Research Area:

- Uncertainty modeling and decision science for environmental systems
- Water quality assessment and monitoring
- Environmetrics

Email ID: skarmakar@iitb.ac.in



Prof. Suparna Mukherji

Research Area:

- Water and Wastewater Treatment, Reuse and Management
- Bioremediation
- Monitoring and Removal of pathogens and emerging contaminants
- Fate and transport of pollutants in aquatic and subsurface systems
- Environmental nanotechnology
- Resource recovery

Email ID: mitras@iitb.ac.in



Prof. Swatantra Pratap Singh

Research Area:

- Desalination and wastewater treatment by membranes
- Environmental nanotechnology
- Climate change mitigation and adaptation
- Pollution control technologies
- Waste to value-added products
- Biofouling control by nanomaterials
- Physico-chemical & biological treatment processes Environmental quantum chemical modeling
- Fate & transport of organic and emerging

Email ID: swatantra@iitb.ac.in



Prof. Tabish Nawaz

Research Area:

- Water and Wastewater Treatment coupled with Resource Recovery
- PFAS remediation
- Nanofiber synthesis
- Ion-exchange, adsorption and electrochemical process development
- Process chemistry

Email ID: tnawaz@iitb.ac.in



Prof. Vamsi Botlaguduru

Research Area:

- Water and Wastewater Treatment
- Air Quality Trends Analysis
- Assessment of stormwater pollutant loads

Email ID: vamsi.bvs@iitb.ac.in



Prof. Virendra Sethi

Research Area:

- Aerosol and air quality
- Hot gas clean-up (thermal gasification)
- Nano-Powder synthesis
- Satellite remote sensing for air quality

Email ID: vsethi@iitb.ac.in

Products/ Software Development:

Prof. Srinidhi Balasubramanian:

- Co-developer of Global InMAP - a rapid
- computationally efficient tool for air quality modeling applications

Prof. Anil Kumar Dikshit:

- SafeSan: On-spot Toilet with Treatment
- gSTP: Green STP for Treating Sewage the Nature Way
- NTreat: In-situ Nallah Treatment for Treating Wastewater in City Drains
- mWTP: Mobile Water Treatment Plant for Emergency Situations
- STP-on-Wheels: Mobile Sewage Treatment Plant for On-site Treatment & Recycling
- mLSC: Mobile Street Litter Collector for Collecting Litter from Streets, Footpaths and Market Places
- CalSiCo: Patented Adsorbent for Decontaminating Arsenic from Groundwater
- ANS-IITB-V8: *Aspergillus Niger* Fungal Specifies for Decolorization of Distillery Wastewater (NIM accession number 1353)
- IMSWM: Integrated Municipal Solid Waste Management System for Day-to-Day Operation
- LWMS-FCC: Legacy Waste Management System - Forest in City Concept
- LWMS-BMA: Legacy Waste Management System - Bio-Mining Approach
- Daksh - The Household Composter
- FABR: Fungal Aerobic Bio Reactor for Decolorization of Distillery Wastewater
- FASBR: Fungal Aerobic Sequential Bio Reactor (FASBR) for Decolorization of Distillery Wastewater
- FSMBR: Sequential Membrane Batch Reactor (SMBR) for Decolorization of Distillery Wastewater
- HBR: Hybrid Anaerobic Baffled Reactor (HAnBR) and Granular Bed Anaerobic Baffled Reactor (GRAnBR)
- MBT: Microalgal Bio Tower for Municipal Wastewater Treatment
- SBR-SZ: Sequential Batch Reactor with Selector Zone (SBR-SZ) for Treatment of Landfill Leachate for Treatment for Distillery Wastewater
- Syn-Soil: Synthetic Soil from Industrial Waste (Syn-Soil) for Revegetation
- GWDB: for interactive Ground Water Data Base management
- IRAS: quality part of Interactive River and Aquifer Simulation
- GW_FEM: for uncoupled FEM modelling of Ground Water pollutant transport and simulation
- RVRSIM: for River water quality Simulation
- RAQSIM: for Regional Air Quality Simulation
- CASP: for Computer aided design of Activated Sludge Process
- DAWAT: for Designing A Wastewater Treatment plant
- LSM-Refinery: Linear Programming Model for On-line Pollution & Environmental Impact Minimization in Petroleum Refinery

- LSM-UMM: LCA based Mobility Model for Various Options viz. Local Trains, Metros, BEST Buses, Cars and Autos in the Mumbai City
- LSM-Roads: Environmental Assessment of Roads and Road Infrastructures using LCA
- LSM-Steel: LCA based Sustainability Model for Iron & Steel Industry
- SUMM: Decision Support System for Sustainable Urban Mobility Management
- NNM-AQPredictor: Neural Network Models for Air Quality Prediction
- CNPS: Cornell model for the estimation of Non-Point Source Pollutant Loadings
- WADNIS: for Water Distribution Network Information System
- RA_WQ: for Risk Assessment due to Water Quality
- Locate_LF: for Locating Solid Wastes Landfill Sites
- Stormwater_Model: for Urban Storm Water Management
- MSW_Router: for Designing Solid Wastes Collection Systems in Urban Areas

Prof. Anurag Garg:

- Composting bins for household wet biodegradable waste
- Waste derived catalysts for wastewater treatment
- Process development for sewage sludge and biomethanated spent wash

Prof. Abhishek Chakraborty:

- Low cost sensor automated calibration software (under development)

Prof. Manoranjan Sahu

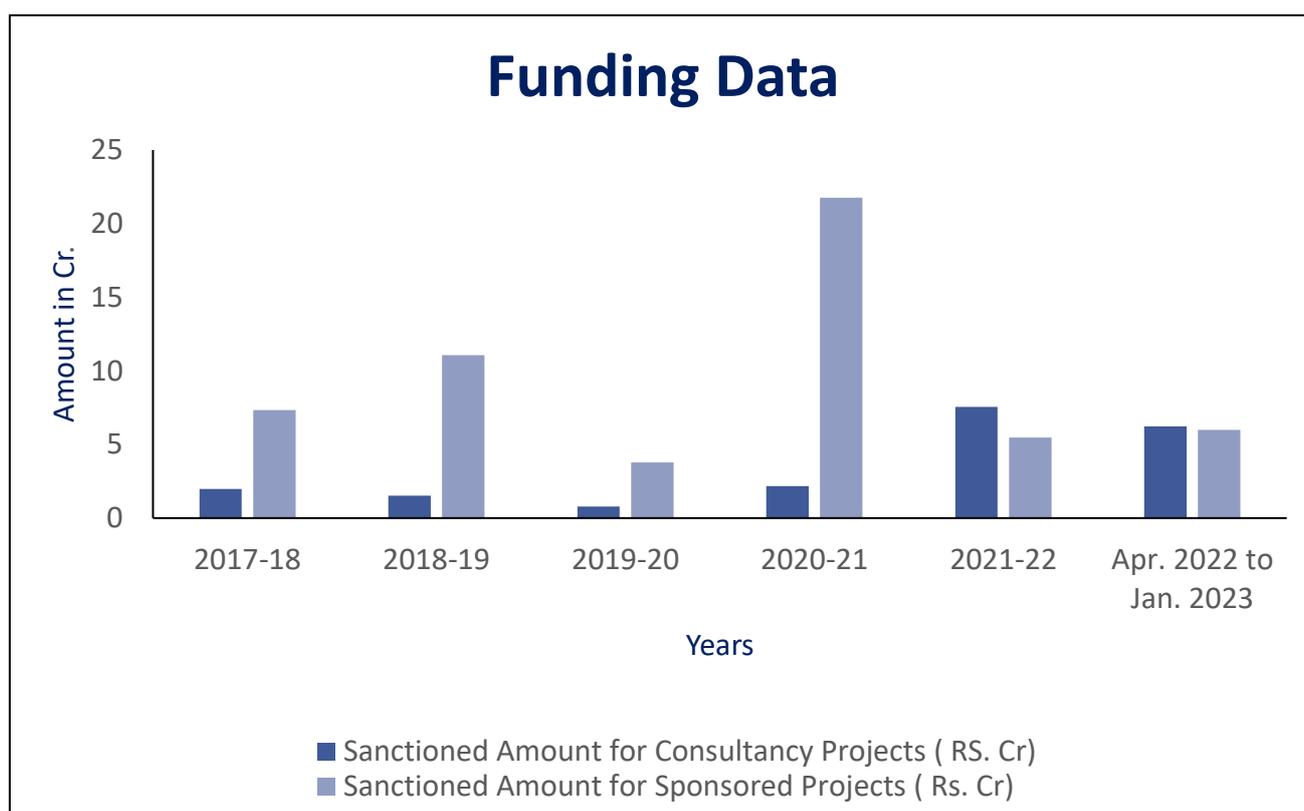
- Machine learning algorithm for calibration of low-cost PM sensor
- Machine Learning based Source Apportionment Method
- IoT based real-time air quality management system

Prof. Tabish Nawaz:

- Adsorbents from waste-derived material for PFAS removal
- Nanofibers from food waste material

Projects (2021-22)

Projects	Sponsored Projects	Consultancy Projects
New	02	15
Ongoing	25	23
Completed	04	09



Short-term Training Courses Organized

- “Product Carbon Footprint and LCA/PCF Software”, Bhilai Steel Plant, Bhilai, December 11-12, 2012.
- “Water Footprint for Steel Industry”, Bhilai Steel Plant, Bhilai, December 17-18, 2012.
- “Water Footprint for Steel Industry”, Durgapur Steel Plant, Durgapur, January 2, 2013.
- “Water Footprint for Steel Industry”, Bokaro Steel Limited, Bhokaro, January 3, 2013.
- “Water Footprint for Steel Industry”, Rourkela Steel Plant, Rourkela, January 5, 2013.
- “Foundation of Environmental Statistics”, IIT Bombay, July 21-25, 2014.
- “Addressing Special Focus Areas in SWM (Biomedical/Slaughter House/ Hazardous/ E-Waste)” sponsored by Municipal Corporation of Greater Mumbai, held during February 18-20, 2015, at IIT Bombay.
- “Addressing Special Focus Areas in SWM (Biomedical/Slaughter House/Hazardous/ E-Waste)” sponsored by Municipal Corporation of Greater Mumbai, held during March 12-14, 2015, at IIT Bombay.
- “Planning and Design of Scientific Landfill Sites (Including Framework for Management and Safe Closure Technology Options)” sponsored by Municipal Corporation of Greater Mumbai, held during April 15-17, 2015, at IIT Bombay.
- “Planning and Design of Scientific Landfill Sites (Including Framework for Management and Safe Closure Technology Options)” sponsored by Municipal Corporation of Greater Mumbai, held during April 20-22, 2015, at IIT Bombay.
- “Technological Advancements in Sewage Treatment Including Basic Concepts” sponsored by Municipal Corporation of Greater Mumbai, held during August 24-26, 2015, at IIT Bombay.
- “Design and Construction of Wastewater Treatment Facilities (Including Detailed Facility Design)” sponsored by Municipal Corporation of Greater Mumbai, held during September 21-24, 2015, at IIT Bombay.

- “Environmental Management of Pharmaceutical Industry” sponsored by Andhra Pradesh Pollution Control Board, held during October 5-9, 2015, at IIT Bombay.
- “Addressing Special Focus Areas in SWM (Biomedical/Slaughter House/Hazardous/ E-Waste)”, sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, February 18-20, 2015.
- “Addressing Special Focus Areas in SWM (Biomedical/Slaughter House/Hazardous/ E-Waste)” sponsored by Municipal Corporation of Greater Mumbai a IIT Bombay, March 12-14, 2015.
- “Planning and Design of Scientific Landfill Sites (Including Framework for Management and Safe Closure Technology Options)” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, April 15-17, 2015.
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- “Technological Advancements in Sewage Treatment Including Basic Concepts” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, August 24-26, 2015.
- “Design and Construction of Wastewater Treatment Facilities (Including Detailed Facility Design)” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, September 21-24, 2015.
- “Environmental Management of Pharmaceutical Industry” sponsored by Andhra Pradesh Pollution Control Board at IIT Bombay, October 5-9, 2015.
- “Technological Advancements in Sewage Treatment Including Basic Concepts” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, To be conducted on February 15-16, 2016.
- “Technological Advancements in Sewage Treatment Including Basic Concepts” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, February 18-19, 2016.
- “Total Quality Management (TQM) in Sewerage Operations including (Scheduling Equipment & Instrumentation Maintenance (Preventive Maintenance) and Managing Large Scale Automated Control Systems)” sponsored by Municipal Corporation of Greater Mumbai at IIT Bombay, March 14-15, 2016.

Workshops & Conferences Organized

- “Green Technology for Waste Management” (GTWM06) jointly with the Goa Engineering College, Goa at Goa, April 20-21, 2006.
- “Development of Action Plan for Environmental Improvement of Mithi River and Its Banks” sponsored by Mumbai Metropolitan Regional Development Authority at IIT Bombay, March 5, 2006.
- “Air Quality: Modelling the Global Transport and Transformation of Toxic Substances” at CESE, IIT Bombay on February 16-17, 2011.
- “National Level Awareness Initiative on “Environment, Energy and Ecology (AIEEE2013)” organized by ESEA at IIT Bombay, Mumbai, March 16, 2013.
- ENVIRON-2015 organized by CESE at IIT Bombay, Mumbai, March 21, 2014.
- Stakeholders Consultation Meeting under “CLIMTRANS Project-Coping with Climate: Assessing Transport Sector Strategies for Climate Change Adaptation and Mitigation for Indian Cities” at IIT Bombay, held on July 21, 2015.
- “Appropriate Technologies for Treating and Disposing Municipal Solid Waste” in collaboration with SINE incubated Firm SWEEP Enviro Private Limited, at SINE, IIT Bombay, Mumbai, February 25, 2016.
- “2nd International Conference on Life Science and Technology” (ICLST 2012) organized by Asia-Pacific Chemical, Biological & Environmental Engineering Society at Hong Kong, January 5-7, 2012.
- “2nd International Conference on Clean and Green Energy” (ICCGE 2012) organized by Asia-Pacific Chemical, Biological & Environmental Engineering Society at Hong Kong, January 5-7, 2012.
- “3rd International Conference on Environment and Sustainable Development” (ICESD 2012) organized by Asia-Pacific Chemical, Biological & Environmental Engineering Society at Hong Kong, January 5-7, 2012.
- “Water-Energy Nexus in the 4th International Symposium on Energy and Environment” organized by McDonnell International Scholars Academy at Bombay, December 9-12, 2012.
- “International IITB-SPEA-Indiana University Workshop on Water and Environmental Management” organized by IIT Bombay, May 5-6, 2015.

- “UNESCO Workshop on Water Security for Cluster Countries” sponsored by UNESCO New Delhi, organized by IIT Bombay in collaboration with National Institute of Hydrology Bhopal Regional Centre and National Institute of Technology Hamirpur at Bombay, November 26-27, 2015.
- “IITB-UNESCO Workshop on Ensuring Water Security in Changing Environmental Scenario for Cluster Countries sponsored” by UNESCO New Delhi, held on November 26-27, 2015, at IIT Bombay.
- “International IITB-SPEA-Indiana University Workshop on Water and Environmental Management”, held on May 5-6, 2015, at IIT Bombay.
- “Stakeholders Consultation Meeting under CLIMTRANS Project”, held on July 21, 2015, at IIT Bombay.
- “Workshop on Hazardous and Medical Waste” organized by Goa Chamber of Commerce and Industry on February 19, 2016. He also delivered talk on “Design, Operation and Maintenance of Secure Landfill for Biomedical and Hazardous Wastes”.
- "National Environmental Conference (NEC-2019)", 31 January-2 February 2019, IIT Bombay.
- "Source Apportionment and Impact Assessment" in the 4th Indian International Conference on Air Quality Management (IICAQM-2019), 18 December 2019, IIT Bombay.
- “Workshop/Webinar on UN Sustainable Development Goals for Attaining Sustainability”, organized by IIT Bombay jointly with University of Hyderabad, October 24, 2020, IIT Bombay.
- “5-week online workshop on Bio-medical Waste Management During & After Covid-19”, jointly with TSEC Mumbai, IIT Bombay.
- Symposium on Data Analytics”, Organized for Russian-Indian Network of Universities (RIN), 6-7 October 2020, IIT Bombay.
- “Symposium on Nano Materials”, Organized for Russian-Indian Network of Universities (RIN), 3-4 November 2020, IIT Bombay.
- “Webinar on "Importance of Environmental Sustainability for Industries", organized by IIT Bombay, April 24, 2021.
- “Webinar on Importance of Environmental Sustainability for Industries", April 24, 2021.

Awards

Prof. Abhishek Chakraborty:

- Young faculty award IIT Bombay 2021

Prof. Amritanshu Shrivastav:

- Recipient of S.D. Bokil memorial award for best M. Tech. student in Environmental Engineering and Management Programme, IIT Kanpur, 2008

Prof. Anil Kumar Dikshit:

- Chairman, Board of Governors Gold Medal, 1985
- Prof. K.K. Nigam Memorial Gold Medal, 1985

Prof. Anurag Garg:

- IIT Bombay Research Publication Award, 2020
- Prof. S.P. Sukhatme Award for Excellence in Teaching, 2020
- Nawab Zain Yar Jung Bahadur Memorial Prize, 2013
- Nominated as visiting scientist by INSA, 2012
- University Medal, 1999

Prof. Harish.C. Phuleria:

- Young Faculty Award, IIT Bombay, Nov 2013
- Third place winner in Graduate Student research competition SCAQMD's Ultrafine Particle conference, Los Angeles, CA, USA, Apr 2006

Prof. Shyam.R. Asolekar:

- Research Excellence Award 2020, IRCC, IIT Bombay

Prof. Subhankar Karmakar:

- Vice-chairperson, International Conference on Flood Management (ICFM) Ad Hoc Committee, 2020
- Research Excellence Award 2020, IRCC, IIT Bombay
- Professor S.P. Sukhatme Award for Excellence in Teaching 2019, IIT Bombay

Prof. Vamsi Botlaguduru

- Young Faculty Award, Indian Institute of Technology Bombay

Prof. Suparna Mukherji:

- 51 women achievers in STEM by CII (COConfederation of Indian Industry) 2021
Fellows of Indian National Academy of Engineering (INAE) 2021
- 2009, National Women Bio scientist Award (Junior Category), DBT New Delhi
- 2000, AICTE Career Award for Young Teachers awarded by AICTE, AICTE, New Delhi

Prof. Manoranjan Sahu:

- 2019, Young Faculty Award, IIT Bombay, 2019
- 2012, Distinguished Dissertation Award-First Place for original work that makes an unusually significant contribution, Air & Waste Management Association
- 2012, Scholarship for CEM Certification, University of Illinois at Urbana-Champaign
- 2011 & 2012, Highly cited paper award, Chemical Engineering Science journal

Prof. Munish Kumar Chandel:

- 2013, Young Faculty Award, Indian Institute of Technology Bombay, Mumbai, India,
- 2007, International Energy Agency (IEA), Scholarship to attend International Summer School on CO₂ capture and storage, near Munich, Bavaria, Germany,
- 2006, Swiss agency, Travel grant by Swiss agency to attend International Disaster Reduction Conference IDRC, Davos, Switzerland
- 2004, French Govt. Fellowship (EGIDE Scholarship), Research at Ecole des Mines de Nantes, France

Prof. Sanjeev Chaudhari:

- 1998-99, INSA Visiting Scientist fellowship, INSA
- 1997, Indira Gandhi Fellowship for Environmental Conservation, EPCO, Bhopal
- 1996, Career Award for Young teachers AICTE (All India Council for Technical Education)
- 1987, Best Young Scientist Award. Council of Science and Technology, Bhopal

Prof. Virendra Sethi:

- 2002, Excellence in Teaching Award, IIT Bombay
- 1994, Oak Ridge Fellowship, USEPA, Cincinnati
- 1985, Outstanding Engineer of the Year, ONGC, Bombay

Prof. Tabish Nawaz:

- Distinguished Doctoral Fellowship, University of Massachusetts Dartmouth August 2013 – August 2017
- Best Poster Award, 22nd Sigma Xi Annual Poster Presentation April 2015
- Catalyst Challenge Award 2018, Massachusetts Clean Energy Centre (Received as a Co-PI) July 2018
- Young Faculty Award, Indian Institute of Technology Bombay November 2018

Prof. Srinidhi Balasubramanian:

- Young Faculty Award, Indian Institute of Technology Bombay
- Career Development Award, University of Minnesota Postdoctoral Association (2019)
- Ravindar K. and Kavita Kinra Fellowship, University of Illinois at Urbana-Champaign (2010–2012)

Prof. Swatantra Pratap Singh:

- Early Research Achiever Award 2021, IIT Bombay
- INAE Young Engineering Award 2020
- INAE Young Associate 2020
- EMS Young Academics 2020
- ISEES Young Scientist Award 2020
- Young Faculty Award 2018
- DST-Inspire Faculty Award: July 2017
- DST- International Travel Grant 2014

RESEARCH CONTRIBUTIONS

Environmental Management

- ❖ Application of preventive environmental management by incorporating waste minimization, cleaner and greener technologies, eco-industrial networking and corporate social responsibility (sectors: ship dismantling and recycling yards, ship repairing yards, ports, individual industry, industrial estates, urban bodies, etc.)
- ❖ Bacterial production of cellulose: a greener alternative to plant based cellulose production
- ❖ Environmental management of toxic metals during reuse and disposal of coal fly ash from thermal plants

Environmental Systems Modeling

- ❖ Development of mathematical models for optimizing vehicle routes for MSW collection in an urban area using GIS
- ❖ Mapping of vulnerability and risk to hydro-climatic extremes at watershed scale and at national scale to facilitate effective mitigation strategy
- ❖ Parametric and non-parametric rainfall, flood and drought frequency analyses for deriving realistic design periods
- ❖ Mapping and assessment of human health risk to MSW landfill leachate contamination
- ❖ Developing near-real-time flood forecasting system for major Indian cities

Water & Wastewater Treatment

- ❖ Developed Community scale Hand-pump attachable arsenic removal filter using indigenous materials to achieve international drinking water standard
- ❖ Developed iron removal filter for treatment of groundwater
- ❖ Developed treatment schemes for removal of residues of pesticides and herbicides such as endosulfan, atrazine and 2,4-D from water
- ❖ Treatment of recalcitrant pollutants present in potable water and industrial wastewater
- ❖ Developed economical and efficient method for treatment of Azo dyes from wastewater of textile industries
- ❖ Treatment of aqueous effluents containing non-aqueous phase liquids (oil/tar)
- ❖ Treatment of domestic sewage and industrial wastewaters for pollution control and reuse especially through combination of tertiary treatment technologies (advanced solutions) with low cost natural treatment systems (ecological solutions) aimed at reuse of sewage and industrial effluents
- ❖ Developed low cost catalyst for catalytic wet oxidation process suitable for industrial wastewater containing refractory compounds like petroleum refinery
- ❖ Developed fungal stirred aerobic reactor and fungal sequential batch aerobic reactor for decolourisation of distillery wastewater
- ❖ Developed advanced oxidation based biodegradability enhancement for further anaerobic treatment of distillery wastewater

Solid & Hazardous Waste Management

- ❖ Utilization options for wastewater treatment plant sludge and industrial sludge: estimating energy recovery potential as cofuel, and preparation of useful materials such as adsorbents
- ❖ Prepared integrated solid waste management plan for Aasonsol city
- ❖ Developed innovative technologies for hazardous wastes

Aerosols & Air Quality

- ❖ Monitoring, modeling and control of indoor air quality in various microenvironments like rural and urban kitchens, schools and malls
- ❖ Dispersion modeling of industries, vehicles and urban area of sources
- ❖ Regional air quality mapping and assessment using GIS
- ❖ Rural energy gasification: Development of small scale clean up systems
- ❖ Establishment of Large-scale Air Cleaning System at two sites in Delhi and Performance Evaluation for Reducing Particulate Air Pollution in Urban Areas
- ❖ Development of a Real time IOT based air quality management system is developed using networks of low-cost particulate matter (PM) sensors and is deployed at IIT Bombay
- ❖ Technology has been developed for disinfection and capture of bioaerosols. Based on photo catalytic oxidation (PCO) followed by capture
- ❖ Machine learning algorithm has been developed for calibration of Low-cost PM sensor

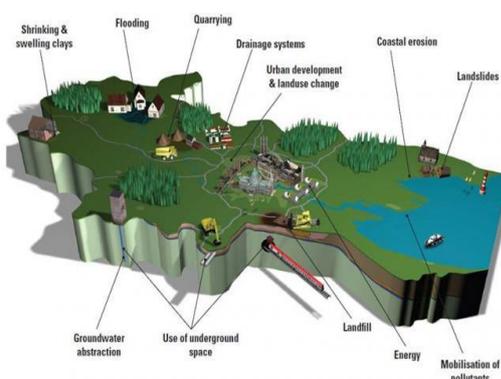
Major Research Areas



Air Quality Management and Pollution Control



Solid and Hazardous Waste Management



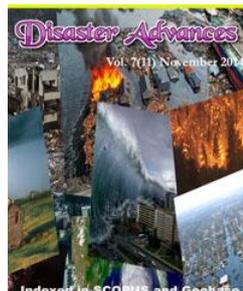
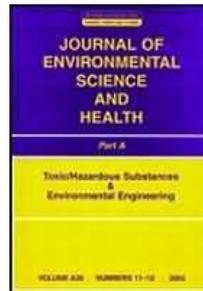
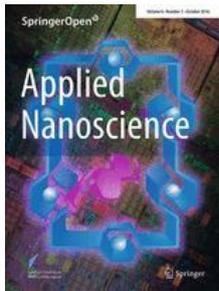
Environmental System Modelling



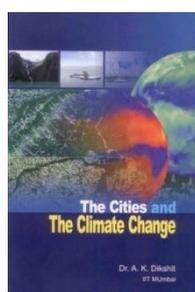
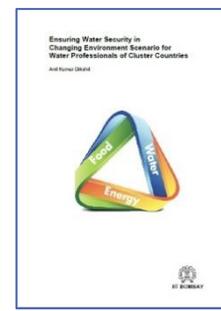
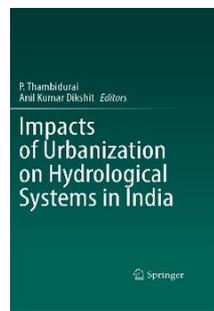
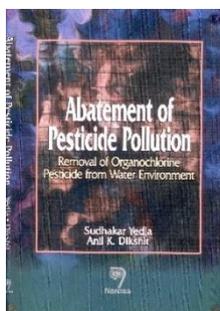
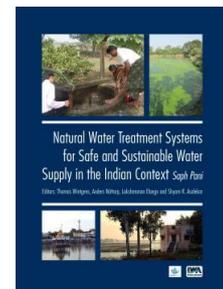
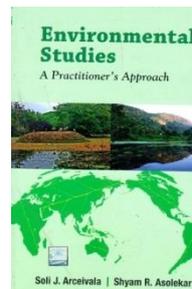
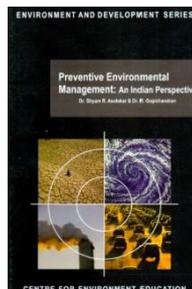
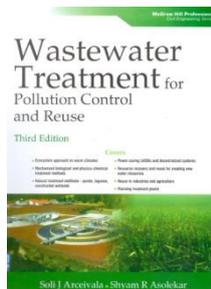
Water and Wastewater Treatment, Reuse and Management

PUBLICATIONS

Journals with Faculty on Editorial Board



Books by Faculty



Major Journals where ESED Papers have been Published

- ❖ Applied Microbiology and Biotechnology
- ❖ Applied Nanoscience
- ❖ Atmospheric Environment
- ❖ Bioresource Technology
- ❖ Chemosphere
- ❖ Chemical Engineering Journal
- ❖ Desalination
- ❖ Desalination and Water Treatment
- ❖ Ecological Indicators
- ❖ Environmental Monitoring and Assessment
- ❖ Environmental Science and Pollution Research
- ❖ Environmental Science & Technology
- ❖ Geophysical Research Letters
- ❖ Journal of Chemical Technology and Biotechnology
- ❖ Journal of Colloid and Interface Science
- ❖ Journal of Environmental Management
- ❖ Journal of Flood Risk Management
- ❖ Journal of Hazardous Materials
- ❖ Nature Scientific Reports
- ❖ Nature Climate Change
- ❖ Separation and Purification Technology
- ❖ Science of The Total Environment
- ❖ Waste Management
- ❖ Water Research
- ❖ Water Resources Research
- ❖ Journal of Aerosol Science
- ❖ Aerosol and Air Quality Research

LABORATORIES & RESEARCH FACILITIES



Q Extractive



TSQ Quantis



Thermo Gravimetric Analyzer



Respirometer



Analytical Instruments Facility - 1



Teaching Lab -1 (Chemistry)



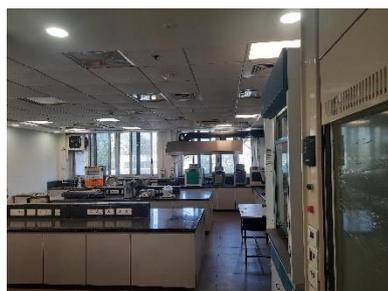
Teaching Lab -2 (Microbiology)



Analytical Instruments Facility - 2



Teaching Lab -3 (Air)



Teaching Lab-4 (Solid and hazardous waste lab)



Analytical Instruments Facility - 4



Gas Chromatography



High Performance
Liquid Chromatography



Total Organic Carbon
Analyser



Analytical Instruments
Facility -3



Teaching Lab-5



Analytical Instruments
Facility -6



CASS



Fluorescence Microscope

Administrative Staff

Name	Designation
Mrs. Nancy Rodrigues	Administrative Superintendent
Ms. Pournima Masram	Jr. Administrative Assistant
Mr. Rajendra Agawane	Office Staff
Mr. Gajanan Baneri	Office Staff
Mr. Anil Jadhav	Office Staff
Mr. Kiran Rathad	Office Staff

Technical Staff

Name	Designation
Mr. Ravindra Surve	Jr. Technical Superintendent
Mrs. Rupwarsha Sorte	Assistant Technical Officer
Mr. Anshul Maheshwari	Technical Superintendent
Ms. Mugdha Padawe	Jr. Lab Assistant
Mrs. Kalyani Sonawane	ERP Staff

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