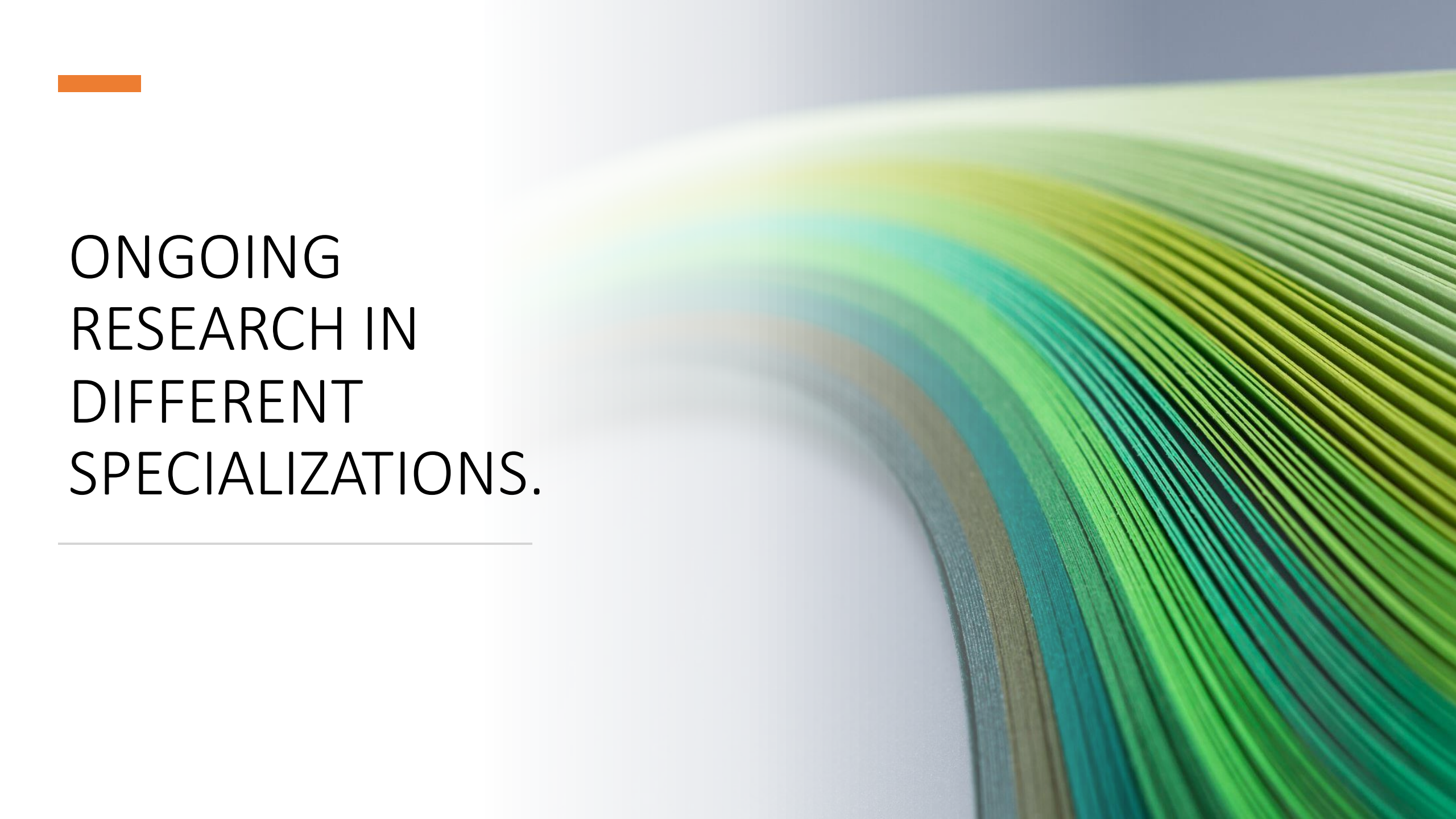
# Department of Civil Engineering IIT Kanpur

## Placement Brochure 2021-2022

# ABOUT US

- The Department of Civil Engineering at IIT Kanpur is serving the nation since 1961 by producing high quality technical workforce needed by industry, R&D organizations, and academic institutions.
- The Department offers B. Tech., B. Tech. - M. Tech. Dual degree in Civil Engineering, and M. Tech. degree in Civil Engineering with Seven specializations, i.e., Structural Engineering, Geotechnical Engineering, Hydraulics & Water Resources Engineering, Transportation Engineering, Geoinformatics, Environmental Engineering and Infrastructure Engineering & Management. The Department also has a vibrant Ph.D. program in all the aforementioned specializations.
- The academic activities of the Department emphasize deep understanding of the fundamental principles, development of creative ability to handle the challenges of Civil Engineering, and the analytical ability to solve problems, which are interdisciplinary in nature. The Department also encourages its students to engage in extra-curricular and co-curricular activities, essential for development, nurturing of team spirit, and developing organizational skills.

# ONGOING RESEARCH IN DIFFERENT SPECIALIZATIONS.



# Structural Engineering

- Seismic analysis of well foundation.
- Seismic behavior of confined masonry structures.
- Seismic strengthening of open ground story building using Aluminum shear link dampers.
- Ground motion characterization.
- Damage estimation of structure under multiple seismic events.
- Wireless Earthquake Monitoring System.
- Digital Wireless Acceleration Measurement System.

# Hydraulics and Water Resources Engineering

- A unified depth-averaged approach for integrated modelling of surface and subsurface flow systems.
- Spatio-temporal variability of soil moisture in a cropped agricultural plot within the Ganga Basin, India.
- Numerical investigation of stream tube approach to model flow in heterogeneous unsaturated sandy soils.
- Diffusion Wave Approximation of Depth-Averaged Flow Interaction with Porous Media.

# Geotechnical Engineering

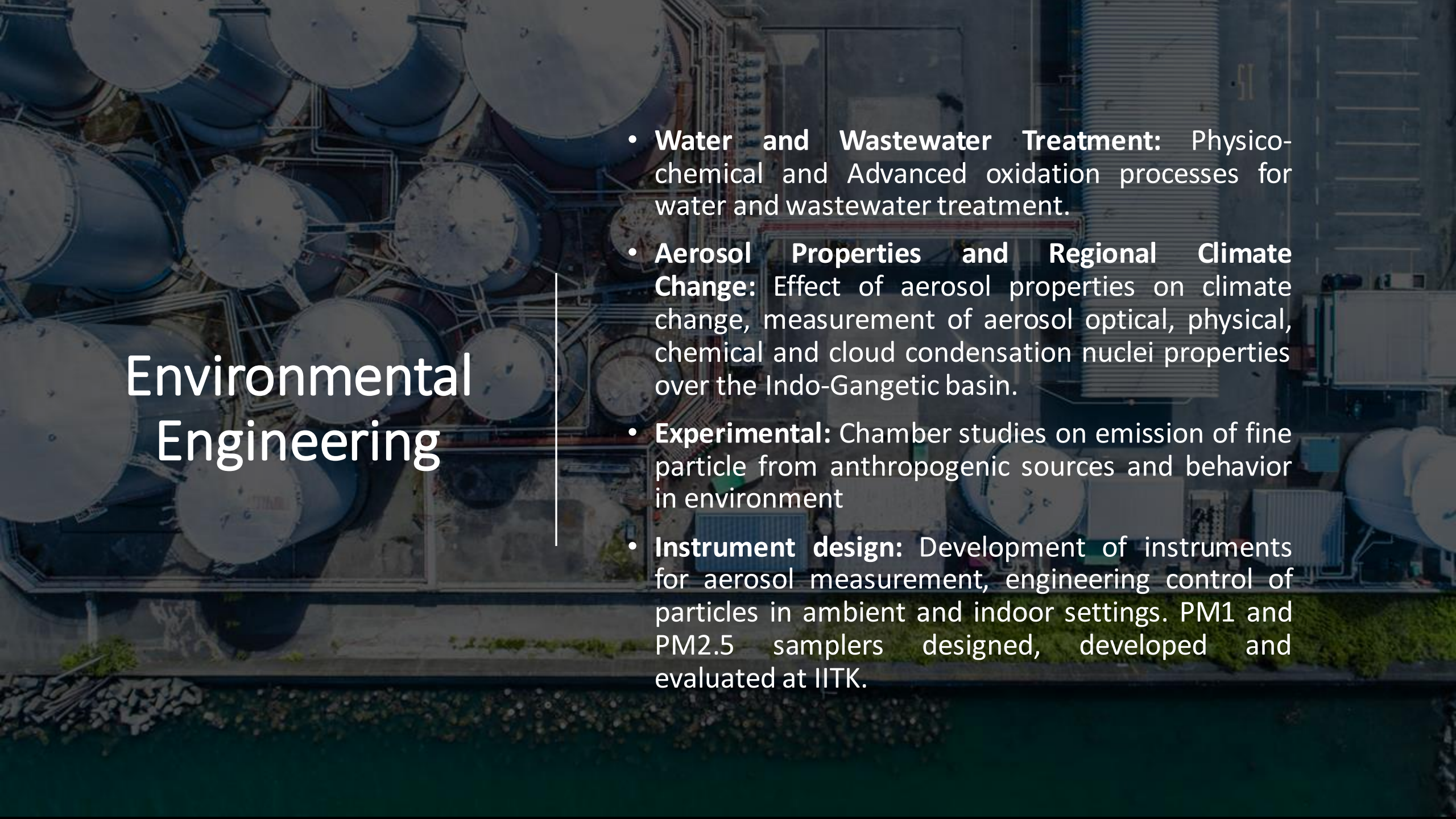
- Earthquake Response Analysis of Soils from Rudrapur and Khatima Sites Adjacent to Himalayan Frontal Thrust (HFT) using Field and Laboratory-Derived Dynamic Soil Properties.
- Axial behavior of tapered piles using cavity expansion theory.
- Hydro-mechanical response in porous rocks during localized deformation: A finite element analysis.
- Stiffness degradation in granular materials due to chemical dissolution.
- A novel vibration screening technique using bamboo – a numerical study.
- The coupled effect of suction and net stress on the air permeability of compacted soils.
- Simplified model to predict features of soil water retention curve accounting for stress state conditions.

# Transportation Engineering

- Data-driven parallelizable traffic incident detection using spatio-temporally denoised robust thresholds.
- Quantifying vehicle control from physiology in type 1 diabetes.
- Public Opinion Analysis of Transportation Policy using Social Media Data: Case Study on the Delhi Odd-Even Policy.
- Self-driven particle model for mixed traffic and other disordered flows.
- Comparison of Discomfort Caused by Speed Humps on Bicyclists and Riders of Motorized Two-wheelers, Sustainable Cities and Society.

# Geoinformatics

- Advanced InSAR algorithms for surface deformation monitoring.
- Deep learning-based classification of the point cloud using CNN architecture.
- Estimation of Earth Orientation Parameters.
- Development of a geoid model for India.
- Multi-sensor approach for surface deformation monitoring.
- Low-cost continuously operating GNSS stations.
- GRACE hydrology.
- Monitoring the cryosphere.
- Automated map generalization to derive multiple representations.



# Environmental Engineering

- **Water and Wastewater Treatment:** Physico-chemical and Advanced oxidation processes for water and wastewater treatment.
- **Aerosol Properties and Regional Climate Change:** Effect of aerosol properties on climate change, measurement of aerosol optical, physical, chemical and cloud condensation nuclei properties over the Indo-Gangetic basin.
- **Experimental:** Chamber studies on emission of fine particle from anthropogenic sources and behavior in environment
- **Instrument design:** Development of instruments for aerosol measurement, engineering control of particles in ambient and indoor settings. PM1 and PM2.5 samplers designed, developed and evaluated at IITK.

# Infrastructure Engineering And Management

- **Construction Management :** Scheduling, Contract management, Quality and Safety management, Economics of construction; Financing of infrastructure projects;
- **Infrastructure Assets :** Roads, bridges, dams, industrial structures and others.
- **Maintenance of Infrastructure Assets :** Impact of failure, risk analysis, monitoring, performance, resilience, service life, repair, condition assessment, non-destructive testing and evaluation.
- **Planning and Creation of Infrastructure Assets :** Environmental Impact Assessment – Life-cycle cost and analysis – Sustainable design and Construction – Service life of structure – Quality Control and Assurance
- **Concrete Engineering :** Concrete and Infrastructure – Concrete engineering practices – Quality control – Codal provisions – Durability of concrete under special conditions – elevated temperature, nuclear emissions, extreme exposure conditions such as sea water attacks, freeze-thaw condition, ground water exposure, etc. – Infrastructure Corrosion – Repair and Rehabilitation of Concrete Structures – Non-destructive testing of concrete

# COURSES OFFERED IN DIFFERENT SPECIALISATIONS

| STRUCTUAL ENGINEERING | HYDARULICS & WATER RESOURCE ENGINEERING | GEOTECHNICAL ENGINEERING | TRANSPORTATION ENGINEERING |
|---|---|---|---|
| Computational Mechanics and Structural Analysis | Hydraulic and Hydrologic Design | ADVANCED GEOTECHNICAL ENGINEERING | Traffic Flow Modelling and Simulation |
| Earthquake Engineering | Advanced Hydraulics | FOUNDATION ANALYSIS AND DESIGN | Characterization of Pavement Materials |
| Seismic Analysis and Design | Advanced Modeling of Subsurface Flow and Transport | ADVANCED STATISTICAL METHODS FOR CIVIL ENGINEERS | Analysis of Pavement Structures |
| Risk and Reliability | Stochastic Hydrology | SOIL STRUCTURE INTERACTION | Traffic Engineering |
| Structural Materials | Sediment Transportation | FOUNDATION DYNAMICS | Pavement Design |
| Concrete and cement based materials | Computational Methods in Hydraulics and Hydrology | GROUND IMPROVEMENT TECHNIQUE | Transportation Economics |
| Sensing and Monitoring | Vadose Zone Hydrology | REINFORCED EARTH STRUCTURES | Airport Systems Planning and Design |
| Design and Experimentation | Ecohydrology | UNSATURATED SOIL MECHANICS | Traffic Safety |

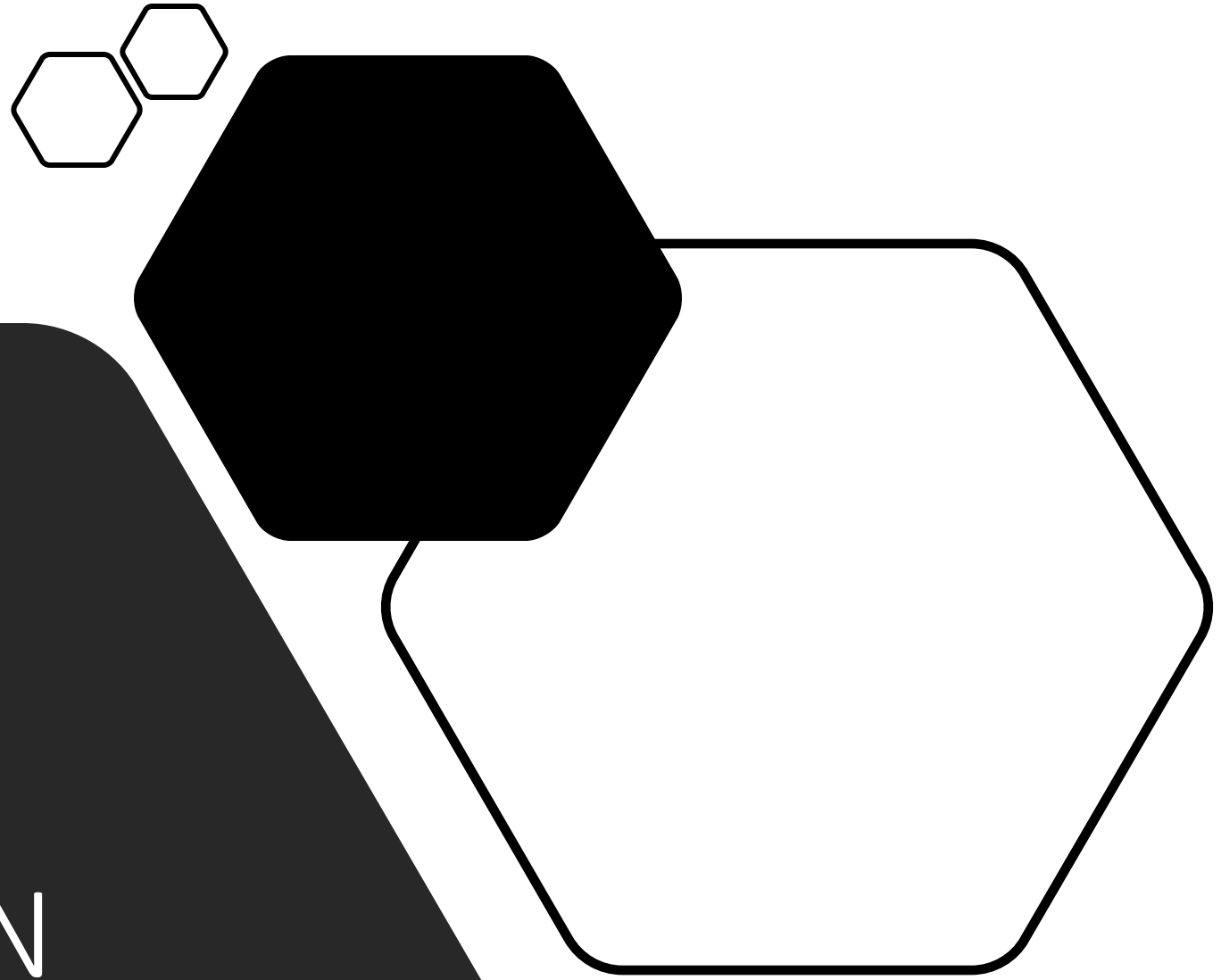
| GEOINFORMATICS | ENVIRONMENTAL ENGINEERING | INFRASTRUCTURE ENGINEERING & MANAGEMENT | INTER – DISCIPLINARY COURSES |
|---|---|---|---|
| Machine Processing of Remotely Sensed Images. | Physicochemical Principles and Processes | Construction Management | C Programming Language |
| Global Navigation Satellite Systems(GNSS) for Surveying and Mapping. | Environmental Quality and Pollution Monitoring Techniques | Infrastructure Assets | Data Structures and Algorithms |
| Laser Scanning and Photogrammetry | Ecological and Biological Principles | Maintenance of Infrastructure Assets | Microeconomics |
| Adjustment Computations in Geoinformatics | Air Pollution and its Control | Planning and Creation of Infrastructure Assets | AI, ML, DL & its Applications |
| Inertial and multi-sensor navigation. | Modeling of Natural Systems | Concrete Engineering | |
| Environmental Geodesy | Atmospheric physics and chemistry | | |
| Introduction to Remote Sensing. | Principles Of Environmental Economics and Management | | |

# INFRASTRUCTURE FACILITIES

| STRUCTUAL ENGINEERING | HYDARULICS & WATER RESOURCE ENGINEERING | GEOTECHNICAL ENGINEERING |
|---|---|---|
| Structural Strong Floor and Reaction Frames: Model 600RD Load Frame | Complete Infrastructure for Physical Modelling of Rivers for Studying Scour Patterns and River | Advanced Cyclic Triaxial Testing Facility, In-situ Testing, SCPT Plate Load Test Facility |
| Loading Devices and Servo-Controller: MTS 407 Controller, MTS 458.10 Controller, Closed Loop Servo Hydraulic Actuator | Training Works, Facility for Hydraulic Testing of Pipes, Fluid Friction Apparatus, Momentum | Spectrum Analyzer for Surface Waves, Seismic Down-Hole Testing Facility |
| Electronically controlled sensors: LVDTs/DCDTs, strain gauges, Velocity Meters (induction type) and Accelerometers (both force balance and capacitive types), IMPACT -ECHO Instrument | Measurement Apparatus, Apparatus to Calculate Sudden Losses in Expansion and Contraction | Geotechnical Digital System (GDS), Geosynthetics Testing Facility for Geogrids and Geonets |
| Concrete Handling Facilities and Measurement of Concrete / Masonry Properties | Bends, Hydrology System, Hydro-Metrological Observatory. | Study of Seismic behavior of soil, Model testing on footings |
| Ambient Vibration Survey System (AVSS), Forced Vibration Survey System (FVSS) | | |
| Electro Dynamic Shaking Table, Servo-Hydraulic Shake Table, Starter kit "Wireless Accelerometer & Bean Gateway Outdoor & Bean Scape Multi-WSN” | | |
| Fiber Optic Based Temperature and Strain Measurement system | | |

| GEOINFORMATICS | ENVIRONMENTAL ENGINEERING | TRANSPORTATION ENGINEERING |
|---|---|---|
| Robotic and Motorized Total Stations, Digital and Auto Levels, Digital Theodolites, Single and Dual Frequency Geodetic Quality Differential GPS Receivers, Navigational GPS Receivers. | Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and Atomic Emission Spectrometry (ICP-OES), Microwave Plasma Atomic Emission Spectrometry (MP-AES), Ion Chromatograph(IC), High Performance Liquid Chromatograph, AAS, TOC, CHNOS Analyzer, GC-ECD-FID | Centrifuge Bitumen Extractor, Marshall Test, Fatigue Test for Bituminous Mixes, Profilograph |
| Permanent GPS Reference Station for Engineering and Scientific Applications, Terrestrial Laser Scanner, Range Camera, Integrated GPS and INS system, Digital Photogrammetric Workstation | Particle Soot Absorption Photometer, Particle Absorption Soot Photometer, Cloud Combination Probe, Condensation Particle Counter, Fog Chamber, Optical Particle Sizer, Micro Pulse Lidar | Rotational Viscometer, British Pendulum Tester, Driver Testing Equipment, Traffic Speed Measurement Radar |
| Software for Geospatial Applications: ERDAS Imagine, ERMapper, ArcInfo and ArcView | Aerosol Mass Spectrometer, Micro-Orifice Uniform Deposition Impactors, Aerodynamic Particle Sizer, Cloud Condensation Nuclear Counter | Stone Polishing Machine, Thin Film Oven Test, Asphalt Content Tester by Ignition Method |
| AutoDesk and Bentley MicroStation Suites, Terrascan, Terramodeller, Polyworks, Leica | Weather Monitoring Station, UV Visible Spectrometer, HDTLC, GC-MS, Optical Particle Counter, Scanning Mobility Particle Sizer. | 91GPS Set-up, Vehicle Detection and Classification System |

# FACULTIES IN DIFFERENT SPECIALISATION



# Structural Engineering

- **Dr. Amar Nath Roy Chowdhury**

- **Areas of interest:** Thin-Walled Structures, Stability of Structures, Nonlinear Finite Element Analysis, Structural Form Finding and Optimization, Plate and Shell Theories, Sandwich Structures, Particle-Based Methods

- **Dr. Chinmoy Kolay**

- **Areas of interest:** Behavior of structures under extreme load events (e.g., earthquake, windstorm, and blast), Real-time hybrid (pseudo-dynamic) simulation, Structural dynamics and control, Nonlinear structural analysis

- **Dr. Durgesh C. Rai**

- **Areas of interest:** Experimental seismic behavior of structures, Seismic evaluation and strengthening, Energy dissipation devices, Masonry and Steel-RC composite members

- **Dr. Purnendu Bose**

- **Area of interest:** Physico-chemical processes for water and waste water treatment, Advanced oxidation processes, Environmental Systems modelling and management

- **Vinay Kumar Gupta**

- **Areas of interest:** Random Vibrations, Earthquake Engineering

- **Dr. Harish K. Venkatanarayanan**

- **Areas of interest:** Microstructure of cement based material, Material characterization techniques, Advanced cementitious materials, Sustainable construction materials, Repair and rehabilitation of concrete structures

- **Dr. Sudib Kumar Mishra**

- **Areas of interest:** Stochastic, Reliability-Based and Robust Optimization of Structures, Reliability and Safety Assessment of Structures, Passive Devices for Seismic Vibration Control

- **Dr. Sudhir Misra**

- **Areas of interest:** Durability and Deterioration of Concrete Structures, Non-Destructive Testing, Concrete Materials

- **Dr. Suparno Mukhopadhyay**

- **Areas of interest:** Structural Identification and Health Monitoring, Structural Dynamics, Earthquake Engineering

- **Samit Ray Chaudhuri**

- **Areas of interest:** Structural Dynamics, Earthquake Engineering, Structural Condition Assessment, Experimental Research

# Hydraulics and Water Resource Engineering

- **Dr. Ashu Jain**
  **Research Interests:** Rainfall-Runoff Modelling, Surface Hydrology, Stochastic Hydrology, Neural Networks and Genetic Algorithms
- **Dr. Rajesh Srivastava**
  **Research Interests**: Flow and Transport through Porous Media, Groundwater Pollution, Climate Change, Sediment Transportation
- **Dr. Richa Ojha**
  **Research Interests:** Flow and transport in porous media, Scaling of hydrological processes, Hydrologic extremes
- **Dr. Saumyen Guha**
  **Research Interests:** Anaerobic Wastewater Treatment, Bioremediation, Microbial Ecology, Fate and Transport of Heavy Metals in the subsurface, Nutrient uptake in plants
- **Dr. Shivam Tripathi**
  **Research Interests**: Statistical Hydrology, Sediment Transport, Eco-hydrology
- **Dr. Gourabananda Pahar**
  **Research Interests:** Computational and experimental hydraulics, Lagrangian particle methods

# Geotechnical Engineering

## • Dr. Nihar Ranjan Patra

- **Research Interest:** Pile foundations, Soil structure interaction and ground engineering, Soil arching, Soil liquefaction, Recycled materials, Field instrumentation

## • Dr. Priyanka Ghosh

- **Research Interest**: Bearing capacity of foundations, Method of characteristics, Upper bound limit analysis, Retaining walls and earth pressure theory, Pullout resistance of anchors

## • Dr. Prishati Roychowdhury

- **Research Interest**: Soil dynamics, Geotechnical earthquake engineering, Seismic soil-structure interaction

## • Dr. Rajesh Sathiyamoorthy

- **Research Interest**: Numerical and Physical Modelling Technique, Environmental Geotechnology, Ground Improvement Techniques, Unsaturated and Fundamental Soil Mechanics, Remote sensing and GIS applications in Geotechnical Engineering

## • Dr. Arghya Das

- **Research Interest:** Constitutive modeling of geomaterials, Micromechanics of granular materials, Bifurcation & instability analysis in geomaterials, Numerical modeling in geotechnical engineering, Physical modeling in geotechnical engineering

## • Dr. Gaurav Tiwari

- **Research Interest:** Rock Mechanics, Experimental study on late dependence of rock joint strength and stability analysis of rock slopes and tunnel

## • Dr. Jagdish Prasad Sahoo

- **Research Interest:** Foundation Engineering, Reinforced earth structures, Stability of tunnels, Underground openings and slopes, Pavement geotechnics, Strength behavior of rocks

## • Dr. Bipin Kumar Gupta

- **Research Interest:** Foundations for Offshore Wind Turbines, Soil-structure interaction analysis and design Numerical and Analytical Methods in Geomechanics

# Transportation Engineering

- **Dr. Partha Chakraborty**

- **Areas of interest:** Car-following behavior, Modeling driver behavior, Travel time estimation, Queues and delays, Capacity & Level-of-service analysis, Origin-Destination matrix estimation, Transit routing, Transit scheduling ,Vehicle routing, Pavement Evaluation, Pavement Management

- **Dr. Animesh Das**

- **Areas of interest:** Pavement material characterization, pavement analysis, pavement design, pavement evaluation and maintenance.

- **Dr. Aditya Medury**

- **Areas of interest**: Road safety management, Transportation infrastructure management

- **Dr. Venkatesan Kanagaraj**

- **Areas of interest**: Traffic flow theory, Crowd dynamics, Connected and Autonomous vehicle

- **Dr. Pranamesh Chakraborty**

- **Areas of interest: D**eep learning and big data analytics-based solutions of transportation engineering problems

- **Dr. Syam Nair**

- **Areas of interest:** Pavement materials, Pavement maintenance and rehabilitation, Recycling of infrastructure materials, Chemical stabilization of soils/aggregate, Utilization of industrial by-products

# Geoinformatics

- **Dr. Onkar Dikshit**

- **Areas of interest**: Remote Sensing Applications, Specific Absorption Rate, Photogrammetry, Geographic Information System, Global Positioning System and Dual In-Line Package for Engineering and Natural Resource Management Problems

- **Dr. Bharat Lohani**

- **Areas of interest**: 3D Laser Imaging and Longest Common Subsequence Measurement, Methodology Development for Motion Correction and Error Analysis in Laser Scanning, Propagation Modelling Using High Resolution Light Detection and Ranging Data, Mapping of Buildings, Specifically Urban and Those of Historical Significance, Using Terrestrial Laser, Laser Scanning of Complex Structures, Development of Light Detection and Ranging Simulator-airborne and Spaceborne, Geographic Information System for Optimized Land Consolidation.

- **Maj Gen (Dr) B. Nagarajan**

- **Areas of interest:** Satellite Altimetry and Gravimetric Studies, Earth Rotation and Polar Motion, Photogrammetric and Remote sensing, Topographical Surveying and Mapping, Regional Geoidal Models

- **Dr. Balaji Devaraju**

- **Areas of interest:** Physical Geodesy, Future Satellite Gravity Missions, Geodetic tools for monitoring the environment.

- **Dr. Salil Goel**

- **Areas of interest:** Light Detection and Ranging, Sensor Fusion, Estimation and Filtering, Global Navigation Satellite System, Inertial Navigation Systems Fusion, Positioning and Navigation

# Environmental Engineering

## Dr. Vinod Tare

- **Area of Specialization:** Processes for natural resource conservation and regeneration – Physicochemical, Biological and Ecological processes, Water and wastewater treatment, modelling and simulation of environmental systems, EIA & EA

## Dr. Mukesh Sharma

- **Area of Specialization:** Environmental Health, Air Quality Modelling and Management, Risk Assessment, Fate Processes of Organic Pollutants and Parameter Estimation

## Dr. Saumyen Guha

- **Area of Specialization:** Fate and transport of pollutant in natural environment, Biological processes and kinetics, Heavy metals in the environment, Bioremediation of Hazardous substances

## Dr. Purnendu Bose

- **Area of Specialization:** Physico-chemical processes for water and wastewater treatment, Advanced oxidation processes, Environmental Systems modelling and management

## Dr. Sachidananda Tripathi

- **Area of Specialization:** Atmospheric aerosol modelling, Cloud physics, Chemical transport modelling, Atmospheric processes in boundary layer, Atmospheric electricity

## Dr. Tarun Gupta

- **Area of Specialization:** Development of instruments for aerosol measurement, engineering control of particles in ambient and indoor settings, physico-chemical characterization of atmospheric pollutants, personal exposure assessment and health effects of inhaled particles, source apportionment of air pollution, and risk assessment

## Dr. Anubha Goel

- **Area of Specialization:** Fate and transport of pollutants, Phase distribution of organic pollutants in the atmosphere, Environmental modeling, Climate change

## Dr. Abhas Singh

- **Area of Specialization:** Environmental geochemistry of heavy metals and inorganic contaminants.

## Dr. P.M. Prasad

- **Area of Specialization**
: Environmental economics

# Infrastructure Engineering AND Management

- **Dr. Sudhir Mishra**

- **Areas of interest:** Durability and Deterioration of Concrete Structures, Non-Destructive Testing, Concrete Materials

- **Dr. K.V. Harish**

- **Areas of interest:** Structural Engineering

- **Dr. Purnendu Bose**

- **Areas of interest:** Physico-chemical processes for water and waste treatment, Abiotic remediation of groundwater resources, Advanced oxidation processes for water and wastewater treatment.

- **Dr. Onkar Dikshit**

- **Areas of interest**: Remote Sensing Applications, SAR, Photogrammetry, GIS, GPS and DIP for Engineering and Natural Resource Management Problems.

- **Dr. Mukesh Sharma**

- **Areas of interest**: Air Quality Modelling and Management, Fate Processes of Organic Pollutants and Parameter Estimation.

- **Dr. Vinod Vasudevan**

- **Areas of interest:** Naturalistic driving studies, Instrumented vehicle studies, Traffic safety, Non-motorized road users, Use of unconventional data in transportation research, Transport economics, and Highway financing.

- **Dr. Syam Nair**

- **Areas of interest:** Pavements and Materials Engineering

- **Dr. N.R. Patra**

- **Areas of interest**: Pile Foundations, Soil Structure Interactions and Ground Engineering, Soil Arching, Liquefaction Potential Evaluation

# PAST RECRUITERS









# Contact Information:

- Students' Placement Office
- 109, Outreach Building
- IIT Kanpur, Kanpur-208016
- U.P. , India.
- Website: http://spo.iitk.ac.in/
- Phone: +91-512-259-4433/34
- Fax: +91-512-259-4434
- E-mail: spo@iitk.ac.in

Department of Civil Engineering

Visit us at:

http://www.iitk.ac.in/ce/


Aritra Nandy

+91-988-310-9135

nandy20@iitk.ac.in

Anshita Srivastava

+91-790-566-4807

anshitas20@iitk.ac.in

Ankit Kumar

+91-798-827-3596

ankitver@iitk.ac.in