



भारतीय प्रौद्योगिकी संस्थान कानपुर
Indian Institute of Technology Kanpur



EARTH SCIENCES

POST GRADUATE PROGRAM

EARTH SCIENCES

The Department of Earth Sciences at IIT Kanpur is deeply engaged in interdisciplinary teaching and research programs of contemporary relevance in Earth Science. The department aims to provide trained manpower for sustainable development and resourcing India's future generations. The Department is active in studying various facets of the Earth and other planetary bodies, encompassing its evolution and internal dynamics, its surface processes, and natural and human-induced transformations of the terrestrial environment vis-a-vis sustainable development. Teaching and research programs in the department are adequately supported by well-equipped laboratory facilities. This program thus provides a sound, topical background in various aspects of Earth Sciences, and will form the foundation for pursuing further advanced studies as well as a wide range of employment opportunities in the mineral, energy, water, environmental and space sectors.



POST-GRADUATE PROGRAMMES OFFERED

- Ph.D. (Earth Sciences)
- M.Tech. (Geological Technology)



LABS/FACILITIES

General Facilities:

- Laboratory for Optical Microscopy with imaging and image processing facilities
- Remote sensing and GIS lab with softwares Arc GIS and ENVI
- Laboratory for thin section and polished section preparation
- Mini-workshop
- All modern facilities for geological field investigations

Specialized Laboratory Facilities:

- **Laboratory for Geochemical studies:** AAS, Q-ICP-MS, ICP-MS/MS, UV-VIS, water isotope analyzer (LGR), Nutrient Analyzer, Class 10,000 metal free clean laboratory, various hand-held water quality probes, ice coring facilities
- **Laboratory for Geophysical studies:** Remotely acquisition UNITES (RAU), Geophones, Seismic Thumper (ESS1000-Turbo), Tromino, Portable Engineering Seismograph, Well Logger, Digital Gravimeter (Sintrex CG-6), Proton Precession Magnetometer (Overhauser), Four electrodes Resistivity Meter (Aquameter CRM500), Multi-electrode Resistivity Meter (SYSCAL R1 plus), Very Low Frequency electromagnetic station (VLF-EM), Geosoft, OpendTect, Echos, Promax, HRS, Kingdom, MOVE.
- **Laboratory for Sedimentology:** Sedigraph, Vibratory Cup mill, SMZ- 100, CL Microscope, carbon analyzer, Hydrobios Gravity Corer, Sediment dredger, Core archive and Analysis facility, pollen analysis and microscopy.
- **Laboratory for Experimental Rock Deformation:** Two state-of-the art high pressure (400 MPa) temperature (1200° C) rock deformation rigs, Gas/Liquid Permeameter, Gas Pycnometer, High Velocity Pulsar/Receiver along with Oscilloscope, Deformation Table. Optical Microscopy, workshop and preparation labs. See more here: <https://home.iitk.ac.in/~smisra/laboratory>.
- **Laboratory for Active Tectonics & Palaeoseismology:** Optically Simulated Luminescence (OSL) and Thermoluminescence (TL) dating facilities, Engineering Seismograph, Ground Penetrating Radar (GPR), Geoslicer.
- **Laboratory for Terrain Mapping and Survey:** Total Station, Differential Global Positioning System (DGPS) & GPS, Image Rover, Unmanned Airborne Vehicle (UAV), multispectral, hyperspectral and thermal cameras for UAVs, LIDAR Terrestrial Scanner, Inflatable boat and engine, Acoustic Doppler Current Profiler (ADCDP), Echo sounder.

Central Facilities:

WD-XRF, Stable isotope ratio mass spectrometry, Mechanical and electrical Workshops, Field Emission Scanning Electron Microscope (FE-SEM); Transmission Electron Microscopy (TEM); Electron Back-scatter Diffraction (EBSD), Electron Micro-probe Analyzer (EPMA), Fourier transform infrared spectroscopy (FTIR), Thermo-Gravimetric Analyzer (TGA) and Differential Scanning Calorimetry (DSC), Atomic Force Microscopy, Vibrating Sample Magnetometer (VSM).

FACULTY LIST

- Paul, Debajyoti; (PhD, Cornell University), Professor and Head, Mantle Dynamics, Crustal evolution, Applied Geochemistry.
- **Sinha, Rajiv**; (PhD, University of Cambridge), Professor River science, Geomorphology, Remote Sensing and GIS, Wetlands, Climate Change
- **Malik, Javed N.**; (PhD, M. S. University of Baroda), Professor Active Tectonics, Paleoseismology, Paleo-tsunami, Natural Hazards.
- **Misra, Santanu**; (PhD, Jadavpur University), Professor Structural Geology, Tectonics, Geodynamics.
- **Sen, Indra Sekhar**; (PhD, Florida International University), Associate Professor River geochemistry, Himalayan cryosphere, Aerosol geochemistry.
- **Syed, Tajdarul Hassan**; (PhD, University of California), Associate Professor Hydrology and Remote Sensing
- **Mandal, Animesh**; (PhD, IIT Kharagpur), Associate Professor Exploration geophysics, Potential field methods, Geophysical data processing and modelling.
- **Dhingra, Deepak**; (Ph.D., Brown University, USA), Associate Professor Planetary remote sensing, Vis-NIR Spectroscopy, Impact cratering, Lunar geology, Enceladus' plume studies
- **Ghosal, Dibakar**; (PhD, Institut de Physique du Globe de Paris), Assistant Professor Exploration Seismology, Tectonics, Convergent Plate margins, Modelling and Inversion, Poroelasticity.
- **Cukkemane, Ishwar Kumar**; (PhD, IISc Bangalore), Assistant Professor Tectonics and crustal evolution, Petrology and geochemistry, Paleogeography, Remote sensing and GIS
- **Agarwal, Amar**; (PhD, IIT Roorkee), Assistant professor Applied structural geology, Impact catering, Rock magnetism.
- **Biswas, Rabiul Haque**; (PhD, Physical Research Laboratory), Assistant Professor Quantitative Earth Surface Processes, Low temperature/thermo chronology, trapped charge dating and dosimetry
- **Banerjee, Anupam**; (PhD, IISc Bangalore), Assistant Professor Major and trace element geochemistry, Radiogenic, traditional (C-O-S) and non-traditional (e.g., Ca) stable isotope geochemistry
- **Boddepalli, Govindarao**, (PhD, IIT Kharagpur); Assistant Professor Ore Geology, Experimental Sulfide Mineralogy, Mineral/Metal-Microbe Interactions
- **Veedu, Deepa Mele** (PhD, Nanyang Technological University, Singapore), Assistant Professor Earthquake Physics, Earthquake cycle modelling, Laboratory friction experiments
- **Sahoo, Hiranya** (PhD, University of New Orleans, USA), Assistant Professor Sedimentology, Stratigraphy, Paleoclimate, Global Warming, Basin Analysis, Landscape Modelling, Petroleum Geology
- **Thupstan Angchuk** (PhD, Jawaharlal Nehru University, 2020), *Assistant Professor* Cryospheric processes and change, Mountain hydrology and meteorology, Geomorphology and Environmental chang

BROAD RESEARCH AREAS OF THE DEPARTMENT

- Mantle Dynamics
- Applied Geochemistry River science
- Active Tectonics and Paleoseismology
- Structural Geology
- High pressure temperature rock deformation
- Hydrology and Remote Sensing
- Exploration Seismology
- Potential field methods
- Planetary remote sensing
- Tectonics and Crustal evolution
- Paleogeography
- Rock magnetism
- Quantitative Earth Surface Processes
- Low temperature/thermo-chronology
- Trapped charge dating and dosimetry
- Radiogenic and stable isotope geochemistry
- Glaciology
- Earthquake physics





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CONTACT

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EARTH SCIENCES DEPARTMENT



ESS1000 WITH 950-1000 Pound hammer
(seismic energy source)



Drone, Phantom 4 Pro, DJI



ICP-MS Lab



Optical Microscopy Lab



Scanning Electron Microscope EM,
JSM-6010PLUS/LA, JEOL Asia Pte



SYSCAL Junior R1 Plus Switch-72 Resistivity meter,
SYSCAL Junior R1 Plus Switch, Iris Instrument, France

