



# Department of Earth Sciences

## Indian Institute of Technology Kanpur



“The secrets of this earth are not for all men to see,  
but only for those who will seek them.”

~ Ayn Rand



The Indian Institute of Technology Kanpur has set up a new Department of Earth Sciences to promote interdisciplinary Earth Science teaching and research programs of contemporary relevance in Earth Science with the goal of providing trained manpower for promoting sustainable development and resourcing India's future generations. The Department of Earth Sciences aims to focus on the study of the Earth, encompassing its evolution and internal dynamics, its surface processes, emphasizing natural and human-induced transformations of the terrestrial environment vis-a-vis sustainable development. Apart from an interdisciplinary teaching programme, students will be trained for high quality research that allows thorough examination of issues related to the Earth Sciences, such as those concerned with natural resources (identification and exploration techniques) and their use to society, solid earth geology, Quaternary geology and the understanding and mitigation of natural hazards. It will thus provide a sound, topical background in various aspects of Earth Sciences, which will form the foundation for further study and for a wide range of employment opportunities in the mineral, energy, water, environmental and space sectors.

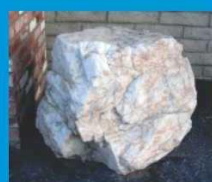
## PROGRAMMES OFFERED

**M.Tech. Programme in Engineering Geosciences (4 Semesters)** has a focus on applied earth sciences and specialized courses in earth surface processes, climate science and natural hazards. The programme consists of 2 semesters of course work and two semesters of research. The M.Tech students are expected to complete 8 courses in the first two semesters with a minimum CPI of 6.0 and then carry out research in one of the specialized areas for the next two semesters. A written thesis has to be submitted and defended at the end of the programme.

The programme aims to provide high quality manpower in Earth Sciences, where intellectual foundations and traditions are anchored in the (a) integration of quantitative data across various earth systems, and (b) application of geological, geophysical and other related analytical methods. Some of our major research areas include river science, natural hazards, environmental geology, hydrocarbons, water and soil chemistry and climate change. The Department encourages however interdisciplinary research and innovative ideas in all possible areas of Earth Sciences.

### Who Can Apply?

Students with M.Sc. degree in Earth Science streams or B.Tech./B.E. degree in Civil/Geosciences Engineering are eligible to apply for the M.Tech. programme. Candidates having M.Sc. degree in other science streams may also be considered. In addition, a valid GATE score will be needed. The GATE requirement will be waived for the B.Tech graduates from IITs with a minimum overall CPI of 6.5 and a minimum CPI of 8.0 in the last two semesters in B.Tech. However, such students are not entitled to Institute Assistantship if the overall CPI is below 8.0







**Ph.D. Programme** in Earth Sciences aims to develop high quality research programs in areas of crust mantle interaction, hydrology, soil formation, climate change, energy, natural hazards with an emphasis on interdisciplinary and quantitative approach. The PhD programme also consists of a combination of course work and independent research.



All PhD students are expected to complete a specified number of credits through course work after which the student must clear a comprehensive (written and oral) examination before he/she is admitted to the candidacy of the Ph.D programme. Subsequently, the candidate is required to deliver a "State of the Art" Seminar on his/her area of research. All PhD students are expected to carry out independent research and are encouraged to present research findings in conferences and publications. Prior to completion, the candidate is required to deliver an "Open Seminar" following which he/she is allowed to submit the thesis and appear for the thesis oral examination.



### Who Can Apply?



Students with M.Sc / M.Tech degree or equivalent in Earth Science streams with CPI/marks not below 6.5 or 65% or Bachelor's degree in engineering with CPI/marks not below 7.5 or 75% are eligible to apply. Valid GATE/UGC/ CSIR score is required for financial assistance, except for graduates from IITs with a minimum CGPA of 8.0. The candidates with DST INSPIRE fellowship for PhD are also eligible.



### Courses

Earth System Processes, Environmental Geology, Geological Hazards, Laboratory practices in geosciences, Igneous and Metamorphic Petrology, Satellite Remote Sensing and GIS for Geo-resource Evaluation, Photogeology in terrain evaluation, River Science, Paleoseismology & Tectonic Geomorphology, Isotope Geochemistry and Applications, Global Climate Change.



## FACULTY LIST AND THEIR RESEARCH INTERESTS



**Sinha Rajiv**, Ph.D (University of Cambridge), Professor; River science - river morphology and dynamics, flood hazards, morphology-ecology linkages, Remote Sensing and GIS Applications, Climate Change and paleoclimate reconstruction.



**Paul Debajyoti**, Ph.D (Cornell University), Associate Professor; Geochemistry, Mantle Dynamics, Paleoclimate reconstruction.



**Tandon S.K.**, Ph.D (University of Delhi). D.N. Wadia Chair Professor; River science, human transformations of river systems, fluvial sedimentology, Paleoclimate.

**Sen, Indra Shekhar**, Ph.D (Florida International University), Assistant Professor; Hydrocarbon exploration, anthro-biogeochemical cycles of environmental pollutants, river chemistry, aerosol source apportionment studies.



# FACILITIES

## Major Laboratory Facilities

Bartington Magnetic Susceptibility Meter, Core Archival and Analysis Facility, Digital Flame Photometer, Drill Core Scanner (DCS) for continuous measurement of magnetic susceptibility and natural gamma ray, Eutech Multi-probe water quality bench meter, Hydrobios Gravity Corer and Core Dredger, Leica Optical Microscopes with modal counting stage, Nikon Stereo zoom microscope, Resistivity Meter, Sedimentological Facilities, Automated sieve shaker, Rock cutter and Thin section preparation units, Total Station, RTK-enabled Kinematic GPS, Inflatable boats, Acoustic Doppler Current Profiler (ADCP), Atomic Absorption Spectrophotometer (AAS) with graphite furnace, X-ray Diffractometer, Water isotope analyzer, Quadrupole ICP-MS, Wet chemistry lab, UV spectrophotometer, Milli-Q system, Muffle furnaces, centrifuge, Unmanned Aerial System (UAS), Imaging Rover System.

## Central Facilities

Electron Microprobe, Stable isotope-ratio mass spectrometer (IRMS), Scanning Electron Microscope (SEM), Vibrating Sample Magnetometer (VSM), X-ray Diffractometer (XRD), wave-length dispersive X-ray Fluorescence (WD-XRF) etc.



*For further details contact:*

Head, Department of Earth Sciences  
Indian Institute of Technology, Kanpur - 208016 (UP) INDIA  
Tel : +512-2597317 (O) +512-2598218(R)  
Email: [heades@iitk.ac.in](mailto:heades@iitk.ac.in)