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## **NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR**

### **Ph.D. Programmes**

The Ph.D. programmes are offered in the following departments for academic session 2009-10

S. No.	Departments	Broad Research Areas
1.	Civil Engineering	Hydrology, Irrigation, Water resources Engg., Optimization of Water resources planning & Operation, Application of Remote Sensing & GIS in WRE, Fluid mechanics; Structures, Earthquake, construction & Management, Environmental Engg.
2.	Electrical Engineering	Power quality, AI applications to Power System Protection.
3.	Mechanical Engineering	<b>Industrial Engineering</b> - Industrial Management, Quality Assurance, ERP, BPR, SCM. <b>Thermal Engg.</b> - (Air Pollution, Energy, CFD), Periodic Heat Conduction, Solar thermal Application with heat & mass transfer, Refrigeration & Air Conditioning. <b>Machine Design</b> -Stress Concentration, Stress Analysis, composite Structures, Smart Structures, Stress Analysis, etc. composite, vibration analysis.
4.	Metallurgical Materials Engineering	Physical Metallurgy, Advance materials and process, fuel cell, GMR materials
5.	Chemical Engineering	Fluidization, Environmental Engineering & pollution, separation techniques, Process identification, extractive distillation, separation science, catalytic reaction.
6.	Bio-Technology	Microbial technology, metabolic engineering of microbial system, fermentation/Enzyme/bioprocess technology, biodegradation and bioremediation, bio-fertilizer, molecular technology, Environmental biotechnology, clinical biochemistry, bio fuel generation, downstream process, biosensors.
7.	Mining Engineering	Rock excavation, strata control, underground coal mining, mine planning, surface mining, rock slope design, computational modelling, ventilation, environment, hydrological studies, remote sensing & GIS.
8.	Mathematics	Fluid mechanics, pure mathematics, modelling theory, algebra, operation research, Fluid dynamics, Computational fluid dynamics shock waves, detonation waves.
9.	Physics	Material science, (Experimental), Luminescence study of some chemically deposited films; theoretical & experimental condensed matter physics, photo electronics, spintronics.
10.	Applied Geology	Structural geology, Remote sensing, GIS.

11.	Applied Mechanics	CAD/CAM, Mechanism synthesis Robotics, Machine Design, Stress Analysis, Finite Element Method, Solid Mechanics, Composite Materials.
12.	Bio-informatics centre	Genome annotation, proteomics, drug/vaccine design.
13.	Chemistry	<p><b>Analytical Chemistry:</b> Synthesis and Applications of Various Hydroxamic Acids as Analytical Reagents.</p> <p><b>Nuclear Chemistry:</b> Analysis of Nuclear Fuel, Extract of Uranium from Nuclear Wastes.</p> <p>Environmental Analytical Chemistry- Analysis of toxicants in environmental samples, monitoring of toxic elements. Synthesis of various organic and inorganic compounds for the development of new analytical method for the analysis of pollutants. Application of microextraction techniques (DDSME, HF-LPME).</p> <p><b>Nanoscience:</b> Synthesis of various types of bare and functionalised nanoparticles (Au, Ag, Pt, SiO<sub>2</sub>, CdS, Cu, Pd, Fe<sub>3</sub>O<sub>4</sub> and TiO<sub>2</sub> NPs etc.). Application of nanoparticles for the mass spectrometry analysis of biomolecules (amino acids, peptides and proteins etc.) pollutants and drugs.</p> <p><b>Pharmaceutical:</b> Analysis of elements in pharmaceutical sample. Pharmacokinetic study of drugs.</p> <p><b>Environmental Chemistry:</b> Pollution aspects of Air, water and soil quality parameters of Domestic and Industrial zone.</p> <p><b>Polymer Nanocomposites:</b> Preparation and Characterization (physical, mechanical, dynamic mechanical and dielectric mechanical and dielectric properties) and Applications of polymer Nanocomposites.</p> <p><b>Microcellular Polymer Composites:</b> Preparation, Characterization and Application.</p>
14	Architecture	Architecture, space syntax analysis, urban planning & design.

The selected full-time candidates shall be eligible to get scholarship/fellowship/assistantship as per guidelines decided by Ministry of Human Resource Development, i.e., for Engineering, Rs. 14,000 per month in first two year and Rs. 15,000 per month subsequently.