

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES) DHANBAD

Department Wise Area of Specialization - Professor & Assoc. Professor

Sl. No.	Departments	Area of Specialization
1	Applied Geology	• For Associate Professor only- Petroleum Exploration, Marine Geology, Mineralogy, Geomechanics, coal Geology, Coal Bed Methane (CBM) • For Professor only- Hyperspectral remote sensing & Spectroscopy of geological materials, Ore Geology & Mineral Exploration & Crustal Evolution
2	Applied Geophysics	Gravity Method, Magnetic Method, Electrical and Electromagnetic Methods, Methods of Geospatial Techniques, Exploration Seismic and Well Logging
3	Chemical Engineering	Molecular Simulations, Molecular Thermodynamics, Process Systems Engineering and control, Energy and Environment, and Process Safety and Hazard.
4	Chemistry & Chemical Biology	• Organic Chemistry • Inorganic chemistry • Physical Chemistry • Computational Chemistry • Materials Chemistry
5	Computer Science & Engineering	Software Architecture and Engineering, Computer Organisation and Architecture, Theoretical Computer Science, Artificial Intelligence, Machine Learning, Operating Systems, Natural Language Processing, Information Retrieval, Formal Methods and Static Analysis, Compiler Design and Optimization, Embedded and Cyber-physical Systems, Computer Vision, Parallel Computing, Distributed Computing, Computer Networks, Databases, Data Analytics, Human Computer Interaction, Ubiquitous Computing, Quantum Computing, Security and Cryptography, Autonomous Intelligent Systems, and Scientific Computing, Blockchain, Image Processing, Optimisation Techniques, Soft Computing, Bioinformatics, Data Mining, Deep Learning, VLSI Design and Testing, Complex Networks, Multimedia Systems.

Sl. No.	Departments	Area of Specialization
6	Civil Engineering	• Structural Engineering Specialization : Stability of Advanced Composite Structures; Seismic Safety of Masonry Structures; Computational Mechanics; Impact Resilience of Non-engineered Structures • Geotechnical Engineering Specialization : Railway Geotechnics; Offshore Geotechnics; GroundImprovement & Geosynthetics; Foundation Dynamics
7	Electrical Engineering	• Control system • Instrumentation • Robotics and automation • Power and Energy Systems. • Power Electronics and Electrical Drives
8	Electronics Engineering	• Fiber Optic Sensors • Microwave Photonics • Silicon Photonics • Quantum Integrated Photonics • Instrumentation • Instrumentation and Control.
9	Environmental Science & Engineering	Air Pollution Control, Environmental Geotechnology, Noise & Vibration, Remote Sensing & GIS, Environmental Geology, Biodiversity Conservation and Management, Environmental Policy & Legislation, Environmental Economics, Environmental Informatics, Water and Wastewater Engineering, Climate Change, Carbon Capture Utilisation and Storage (CCUS).

Sl. No.	Departments	Area of Specialization
10	Fuel Minerals & Metallurgical Engineering	• Mineral Engineering - Process Equipment Selection; Plant Design & Engineering; Process Modeling and Optimization; Critical Minerals Beneficiation; Coal Preparation; Mineral Processing; Process Control; Mineral Processing Economics, Biomineral Processing, Mineral Resource Management, Low iron grade ore processing • Metallurgical Engineering-Ferrous & Non-Ferrous Extractive Metallurgy; Computational Metallurgy; Metallurgical Waste Utilization; Molten Salt Electrolysis, Alloy design • Fuel & Energy Engineering - Coal Characterization and Utilization; Coal Cleaning; Thermochemical Conversion of Solid Fuels; Hydrogen Production, Storage & Utilisation; Syngas and Biofuel Utilisation for Energy, Chemical and Metallurgical Applications; Modelling & Simulation of Energy Systems; Carbon Capture Utilization and Storage (CCUS), Decarbonisation & Sustainability; Waste to Energy; Carbon Credit; Energy Policy.
11	Humanities & Social Sciences	• English: ELT, Linguistics and Applied Linguistics, Literature and Culture, Digital Humanities. • Philosophy: Indian Philosophy, Western Philosophy, Logic, Ethics • Psychology: Applied psychology, Social Psychology, Health Psychology, Cognitive Psychology, Psychometrics. • Sociology: Sociology of development, Urban sociology, Environmental sociology and climate change, Economic sociology, Sociology of work and labour, Digital sociology, Sociology of health, Spatial sociology, Sociology of aging and dying.
12	Management Studies & Industrial Engineering	• Associate Professor: Operations Management • Professor: Marketing Management
13	Mathematics & Computing	• Biostatistics • Computational Fluid Dynamics • Computational Harmonic Analysis • Elastodynamics • Reliability Theory • Wave Structure Interactions

Sl. No.	Departments	Area of Specialization
14	Mining Engineering	• Coal Mining Methods • Metal Mining Methods • AI/ML Application in Mining • Mine safety, Health and Ergonomics • Sustainable Mining and planning • Mining Machinery • Rock Mechanics
15	Mechanical Engineering	• Thermo--fluid: Heat transfer, Thermal management, Bio-fluid mechanics and Bio-heat transfer, Droplet dynamics, Flow diagnostics, Computational Fluid Dynamics (CFD), Turbomachinery, High performance computing. • Design: Dynamics and vibrations, Structural vibrations, Machine condition monitoring, Fracture mechanics, Solid mechanics, Mechanics of solid polymers, Polymers and polymer composites, Computer Aided Design (CAD), Mechanical behavior of materials, Fluid power systems and control, Mining machinery. • Manufacturing: Advanced finishing and post-processing processes, Machining, Non-traditional machining, Additive manufacturing, Micro-precision manufacturing, Surface finishing, Laser processing of materials, Friction stir welding, Digital manufacturing and applied Tribology.
16	Physics	• Material Science (Energy Storage Materials, Optical Spectroscopy, Magnetic Materials and Superconductivity, Semiconductor Materials and Devices) • String Theory • Laser and Plasma Physics • Fibre Optics
17	Petroleum Engineering	Reservoir Engineering, Drilling Engineering, Petroleum Production Engineering, Deepwater and offshore Engineering, Unconventional Energy Resources, Energy Transition & Sustainable Energy System, Digital Technologies in Petroleum Engineering, Health, Safety and Environment (HSE), and Energy Economics & Asset Management.