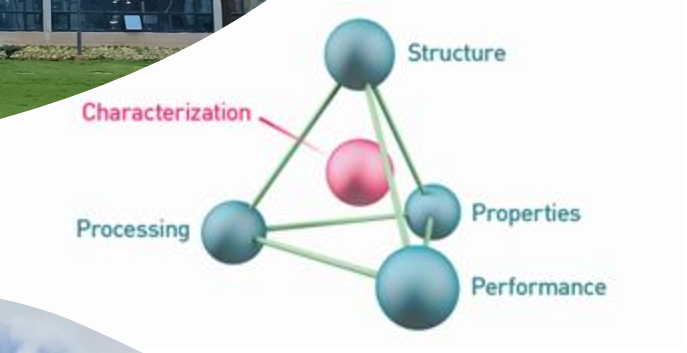
Materials Science & Metallurgical Engineering (MSME)

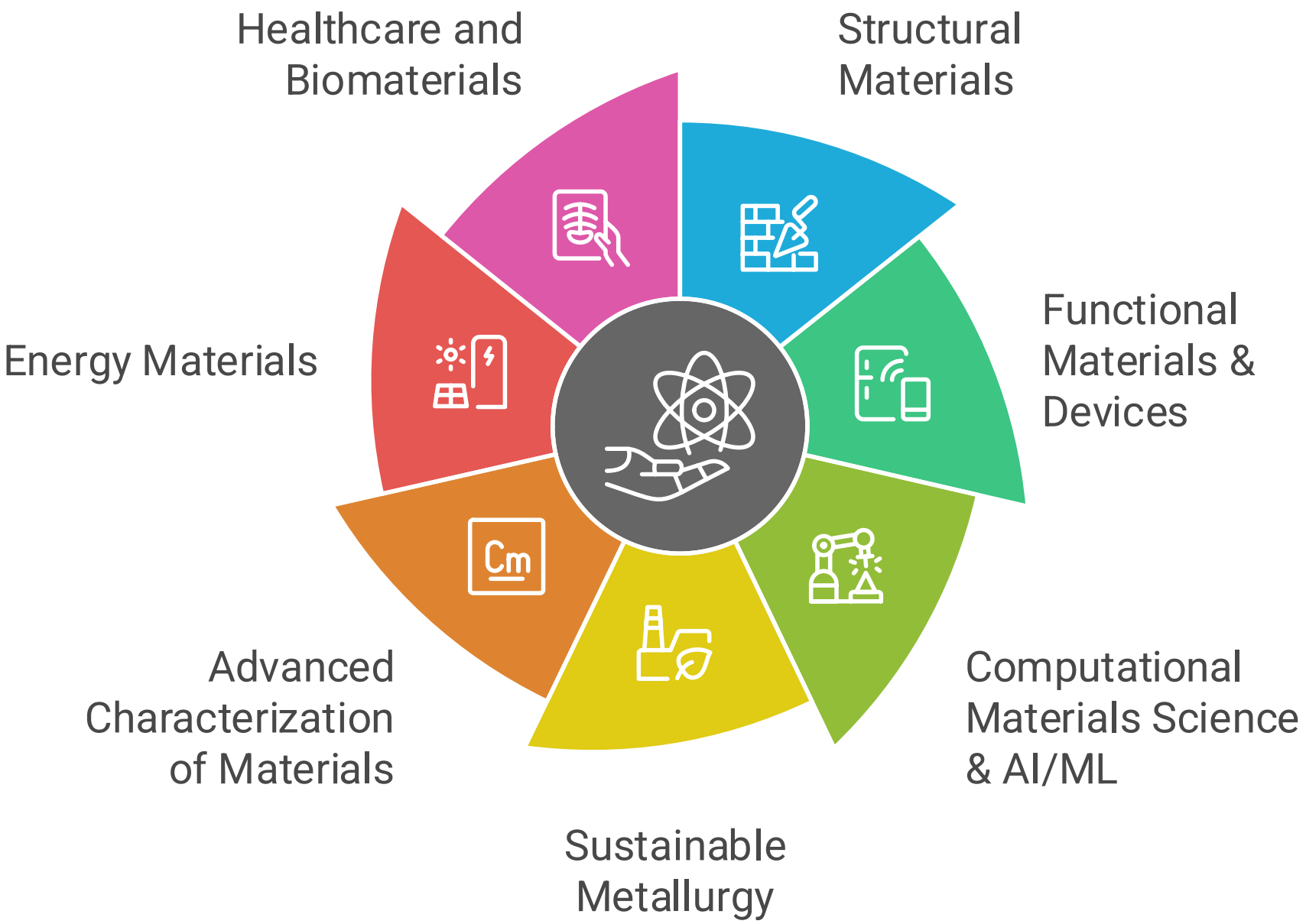


Ph.D. Admissions January 2026

Visit us online: https://msme.iith.ac.in

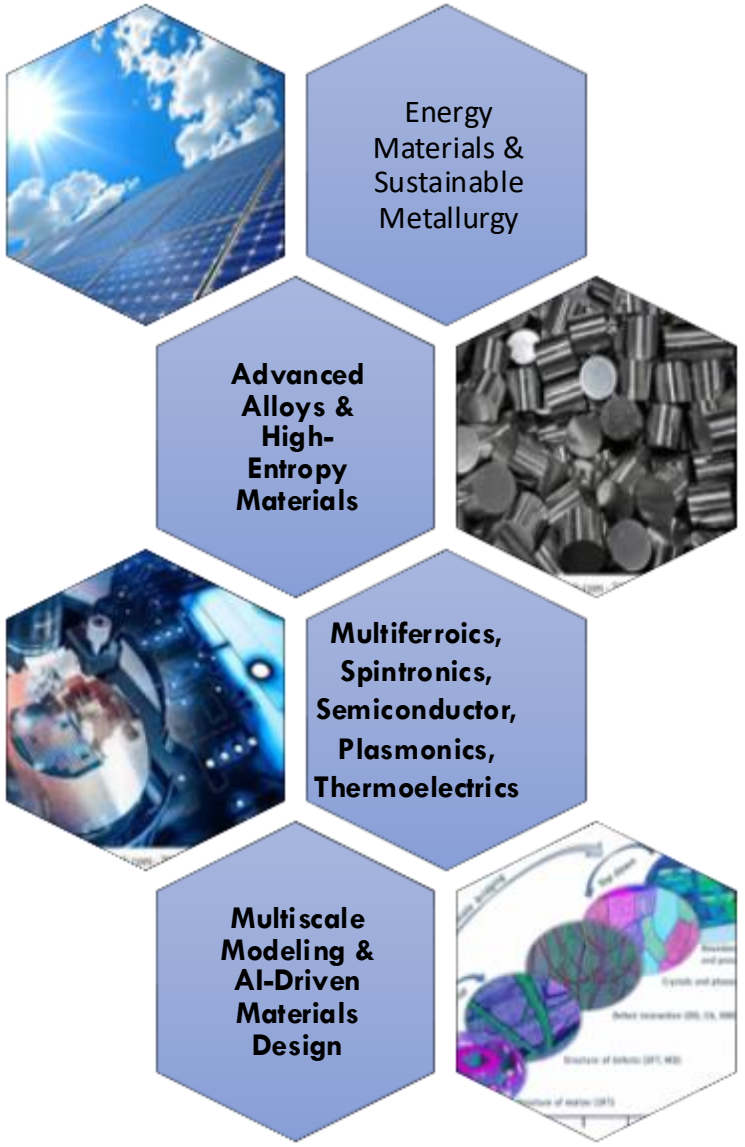
భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Major Research Areas



Why Pursue a Ph.D. with us?

- Work on cutting-edge and innovative research problems
- Access world-class labs & facilities
- Collaborate with industry leaders and top scientists



Selection Process

Stage 1. Screening

Stage 2. Screening interview/written test (MCQ)

Stage 3. Final interview

Visit www.iith.ac.in for more information and apply online

Eligibility & Qualifications

Regular PhD :

- *Candidates with Master's (ME/MTech/MSc)*
- *BE / BTech or equivalent in any discipline with a valid GATE score*
- *MSc or equivalent in any science discipline with a valid GATE score*
- *Qualified one of the national exams: INSPIRE, Joint CSIR-UGC NET with JRF, DBT JRF*
- *BTech students from CFTIs with a CGPA of 8.0 or more are eligible to apply (no GATE required)*
- *External PhD: Working professionals from industry, research laboratory and others*
- *External Direct PhD: Relevant experience with NOC required*

Direct PhD:

- *Direct PhD: High CGPA & High fellowship*
- *PhD Applications are invited from the meritorious students who have got a CGPA of 9.0 and above in their BTech/BE/BS/MSc from IITs, NITs, IISc, IISERs & CFTIs for admission to Direct PhD (High CGPA) program at IITH with high-value Institute Fellowships. (Higher stipend than MoE funding) (Please refer to the flyer on IITH website)*

Please note: The department reserves the right to set a different criterion which can be equal to or above the eligible criteria for shortlisting the candidates for the selection process.

Proposed Ph.D. topics:
(MoE seats: *not an exhaustive list*)

- *In situ Transmission Electron Microscopy, In situ characterization and technique development using MEMS devices (lab on chip), Phase transformations in materials*
- *High entropy alloys for high temperature applications, computation of phase equilibria in rare-earth containing alloys*
- *Process Modeling & Simulation; Extraction & molten metal treatment; continuous casting, inclusion engineering & alloy steel development; hot-slag engineering, metal recycling & life cycle analysis of metallurgical processes*
- *Computational multiscale modeling of metals and alloys, First principles modeling of defects in semiconductors (oxides, nitrides, chalcogenides). Computational materials design for functional (microelectronics, quantum technologies) and structural (superalloys) applications*
- *Thermoelectric Materials and Devices, Magnetic Refrigeration, Thermoelectric Metrology, and Powder Metallurgy*
- *High performance fibers (liquid crystal based processing and scale up), soft porous nanofibrous materials (application and deformation mechanism), semiconducting polymers based actuators, drug delivery systems*

Note: Several projects are running in the Department. If candidates are found suitable, they will be later notified about various open positions through funded projects.

Proposed Ph.D. topics:
(MoE seats: *not an exhaustive list*)

- *Electrochemical Materials Processing: Green/Bio Hydrogen production and Reduction of CO_2 & N_2 via photo-electrocatalysts design, Bioelectrochemical treatment of industrial effluents, Recovery & Recycling of e-wastes (end of life NdBFe permanent magnets, spent Lithium-ion batteries, Silicon PVs) via electrowinning, Electrochemical Iron & Steel Manufacturing, Electrochemical Sensors*
- *Materials for high-energy-density supercapacitors*
- *Advanced Multi-Functional Nanostructured Materials Making (including High Entropy Materials) via Electrodeposition/Green Synthesis: Combinatorial Alloy Design*
- *Spin-orbitronics, Skyrmions, Ferrimagnetic materials, Topological Insulators*
- *Semiconductor materials and devices, field-effect transistors, memristors, and sensors*

Note: Several projects are running in the Department. If candidates are found suitable, they will be later notified about various open positions through funded projects.

Proposed Ph.D. topics:
(MoE seats: *not an exhaustive list*)

- *MXene and other 2D materials-based systems for supercapacitors and energy storage, Post processing, fracture and fatigues studies of additively manufactured superalloys and steels, Ultra high temperature composites, High Entropy alloys based materials through PM route, Application of AI/ML in the design and processing of steels for PM applications.*
- *Atom probe tomography informed exploration of nanoscale chemical heterogeneity (eg: grain boundary segregation engineering) aimed at designing microstructures that mitigate hydrogen embrittlement in steels/Ni-based alloys*
- *Plasmonic metasurfaces for active opto-electronic devices, Quantum optical platforms at cryogenic temperatures, Optical biosensing, Alloy nanostructures for plasmonics, Novel fabrication techniques, Directed assembly of nanoparticles.*

Note: Several projects are running in the Department. If candidates are found suitable, they will be later notified about various open positions through funded projects.

Sponsored Project Ph.D. topics

- *Characterization & valorization of silica & lime sludge (Funding agency: M/s. Alufluoride Ltd, Vizag, 4 years, PI: Dr. Ashok Kamaraj)*
- *Development of BOF process model to optimize coolant addition towards green steelmaking (Funding agency: M/s. Arjas Steel Ltd, Tadipatri, 4 years, PI: Dr. Ashok Kamaraj)*
- *Rare earth extraction from coal and related secondary resources (Project: CLEANZ – CIL, PI: Dr. Ashok Kamaraj)*
- *Microstructure-Texture-Property Correlation in Zr-Nb Alloys for Nuclear Applications, (Funding agency: BRNS, PI: Prof. Pinaki Bhatacharjee)*

Note: Several projects are running in the Department. If candidates are found suitable, they will be later notified about various open positions through funded projects.

Meet Our Faculty

B. S. Murty

Professor

Research Interests

Thermodynamics & kinetics of phase transformations ,
High entropy alloys

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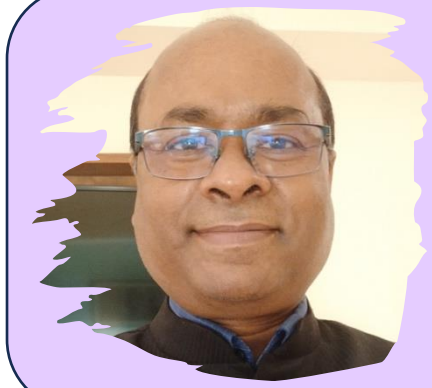

Bharat B. Panigrahi

Professor

Research Interests

Powder Metallurgy
Advanced ceramics & composites

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Pinaki P. Bhattacharjee

Professor

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High Entropy Alloys
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Suhash R. Dey

Professor

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High Entropy Alloys

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G. D. Janaki Ram

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AI-Driven Materials Design

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Atul S. Deshpande

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Novel nanostructured materials for catalysis, energy storage and coatings
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Associate Professor

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Mudrika Khandelwal

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Nanophotonics Sensors

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Nanoporous materials

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In situ and correlative

Characterizations, Corrosion

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Oxide Semiconductors

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Mayur Vaidya

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Magnetic Refrigeration, SOFCs,
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Rama Srinivas Varanasi

Assistant Professor

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