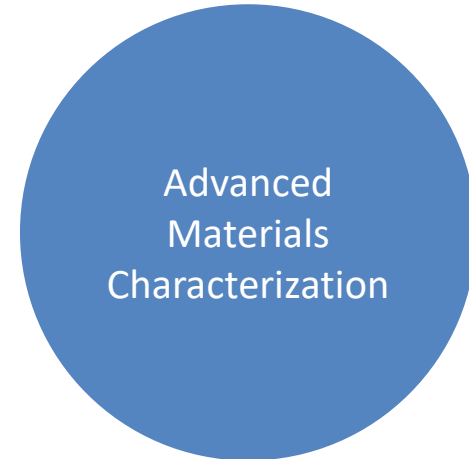
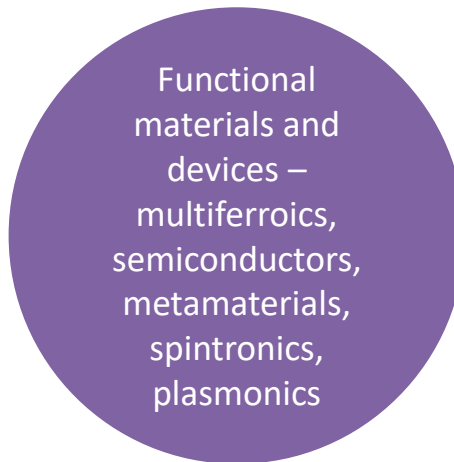
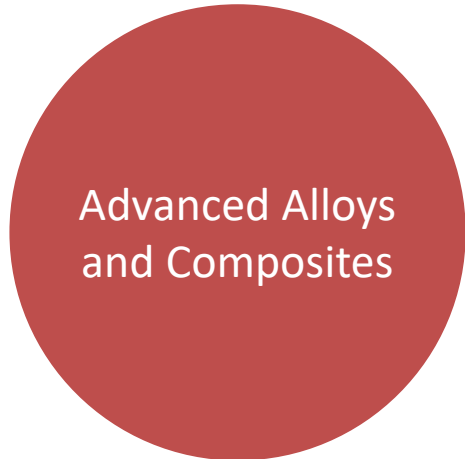
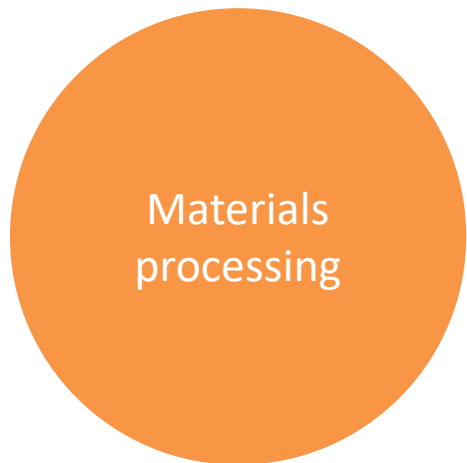


MSME M.Tech Admissions (A.Y. 2024-2025)

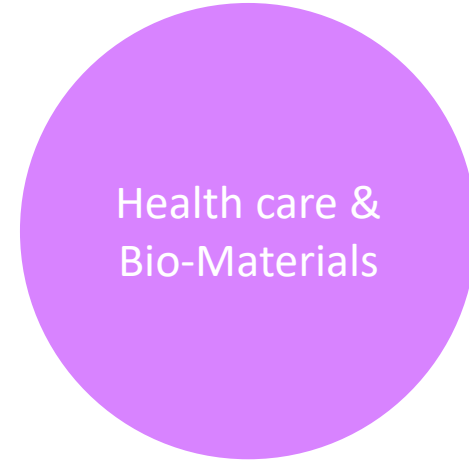
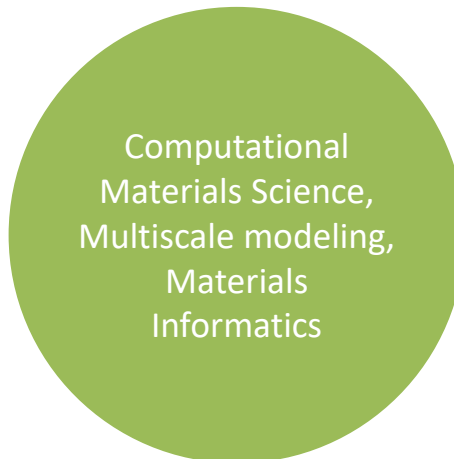
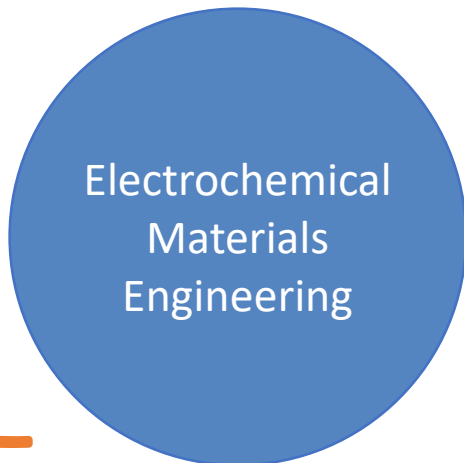
Materials Science &
Metallurgical Engineering

<https://msme.iith.ac.in/>

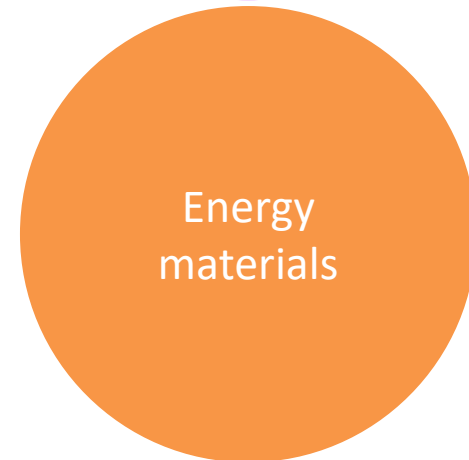




MSME



Research areas



Facilities at MSME

Material Synthesis and Processing

- Pulse Laser Deposition
- E-beam deposition
- Planetary Ball mill
- Rolling mill
- Robotic GTA welding
- Uniaxial Compaction Press
- Cold-Isostatic Press
- Induction-melting furnace
- Arc-melting furnace
- Glass vacuum sealing
- Spin and Dip coater
- Sputtering
- Hot press
- High Temperature Vacuum Furnace
- Infra-red heating furnace
- Muffle and tube furnaces
- Salt-bath furnace
- Autoclave Ovens
- Incubator shaker
- Freeze drier
- Bio-safety cabinet
- Glove-box

Computational

- Thermo-Calc
- DICTRA
- TC-Prisma
- COMSOL Multiphysics, ANSYS
- CrystalMaker Suite
- VASP
- State-of-the-art GPU clusters
- Inhouse NSM Supercomputing facility ParamSeva
- MicroSim



Characterization

- Cold FEG-TEM
- FEG- SEM with EBSD
- Optical Microscopes
- FIB
- Ion-milling, PIPS
- SPM
- Surface area and porosity analyser
- Powder & thin film XRD
- UV visible spectrophotometer
- Raman spectrometer
- DTA, DSC, TGA, Dilatometer
- Universal testing machine (MTS, Instron)
- Creep Testing
- Hardness Tester
- Wear (Pin-on-disk)
- Nanoindenter
- Electrochemical analyser
- Viscometer

MSME Faculty

Prof. B. S. Murty

- Nanocrystalline materials
- Thermodynamics & kinetics of phase transformations
- High entropy alloys
- Bulk metallic glasses
- TEM and atom probe tomography

bsm@msme.iith.ac.in +91 (40) 2301 6001



Prof. Pinaki P. Bhattacharjee

- Design and Development of High Entropy Alloys
- Development of metallic alloys for advanced and emerging applications
- Materials processing, microstructure, and crystallographic texture
- Bulk ultrafine/nanostructured and heterogeneous materials
- Application of high-resolution Electron Back Scatter Diffraction (EBSD) and Transmission Electron Microscopy (TEM) in materials characterisation.
- Mechanical properties of materials

pinakib@msme.iith.ac.in



Prof. G.D. Janakiram

- Welding
- Additive manufacturing

jram@msme.iith.ac.in



Prof. Bharat B. Panigrahi

- Powder Metallurgy & Sintering Mechanisms
- High Entropy Alloys, MAX Phases and MXene,
- Advanced ceramics & composites
- Microstructure-Mechanical Properties of Steels
- Metal Additive Manufacturing,
- Electro-Spark Coating, Wear & Tribology

bharat@msme.iith.ac.in



Prof. Suhash R. Dey

- Electrochemical Materials Engineering (Additive Manufacturing, Metal/metal oxide assisted electrochemical reduction of CO₂, Recovery and recycling of spent Lithium-ion batteries, Silicon PVs electrochemically, Molten salt electrolysis for new age applications, Recovery from electronic wastes using microbial fuel/electrolytic cell)
- Advanced Multi-Functional Nanostructured Materials/High Entropy Alloys: Combinatorial Alloy Design

suhash@msme.iith.ac.in



MSME Faculty

Prof. Saswata Bhattacharya

- Phase transformations in alloys and oxides
- Phase-field modelling of microstructural evolution
- Discrete Dislocation Dynamics
- Materials Informatics – Inverse Modeling
- Development of Multiscale Modeling Techniques and Tools for ICME

saswata@msme.iith.ac.in

Dr. Atul S. Deshpande

- Nanoparticle synthesis and self-assembly, sol-gel processes, templating techniques
- Novel nanostructured materials for advanced applications, including catalysis, energy storage and superhydrophobic coatings
- High entropy oxides

atuldeshpande@msme.iith.ac.in



Prof. Ranjith Ramadurai

- Multiferroic oxide thin films for fundamental science and functional device applications
- High-k dielectric thin films for CMOS technology and memory device applications
- Surfaces and Interfaces of oxide heterostructures on silicon and single crystalline oxide substrates
- Influence of process conditions, strain engineering and interface engineering on domains and domain dynamics of multiferroic thin films utilising scanning probe microscope

ranjith@msme.iith.ac.in

Dr. Mudrika Khandelwal

- High-performance and functional green composites
- Liquid crystals and self-assembly
- Drug Delivery
- Anti-fouling and anti-microbial materials
- Depth filters
- Energy storage and conversion (actuators)
- Nanofibrous devices, functional textiles

mudrika@msme.iith.ac.in



Dr. Subhradeep Chatterjee

- Phase Transformations and Microstructure Development
- Laser and Electron Beam Processing
- Welding and Surface Treatment
- Modelling and Simulation (Phase Field/FEM/CVM)

subhradeep@msme.iith.ac.in

MSME Faculty

Dr. Rajesh Korla

- Deformation at room temperature
- Creep and super-plasticity
- Micro mechanical deformation
- Molecular dynamic simulations
- Nano indentation

rajeshk@msme.iith.ac.in



Dr. Mayur Vaidya

- Diffusion-Deformation correlations in materials
- Phase growth and interdiffusion kinetics in thermoelectric materials
- Diffusion in multicomponent alloys
- Processing, characterisation and stability of nanocrystalline alloys

vaidyam@msme.iith.ac.in



Dr. Sairam K. Malladi

- In situ characterisation and technique development using MEMS devices (lab on a chip)
- Applications of *in situ* and correlative characterisation techniques to understand transformations in materials, Electrochemistry and Corrosion

srkm@msme.iith.ac.in



Dr. Shourya Dutta Gupta

- Plasmonics and Nanophotonics
- Sensors, Lab-on-a-chip devices, Microfluidics
- Alternative materials for plasmonics
- 2D Materials based optoelectronics

shourya@msme.iith.ac.in



Dr. Chandrasekhar Murapaka

- Spintronic-based memory and logic devices
- Nanomagnetic materials, Domain wall dynamics in ferromagnetic networks
- Spin torque nano-oscillators for RF applications
- Spin-orbit torque-induced magnetisation switching and dynamics, Magnetic tunnel junctions
- Micro and Nanofabrication techniques

mchandrasekhar@msme.iith.ac.in



MSME Faculty

Dr. Ashok Kamaraj

- Process metallurgy
- Physical modeling of unit processes
- Iron and steelmaking
- Life cycle analysis of processes and products
- Development of alloy steels

ashokk@msme.iith.ac.in



Dr. Anuj Goyal

- Computational Material Science
- Multiscale modeling
- Electronic structure theory
- Defects thermodynamics, Point defects
- Dislocations and interfaces
- Metals and semiconductors (oxides, nitrides, chalcogenides, halides).

anujgoyal@msme.iith.ac.in



Dr. Deepu J. Babu

- Nanoporous materials
- CVD, Adsorption and Membrane-based gas separation applications
- Carbon nanomaterials, MOFs
- Graphene & Graphyne and other 2D materials
- Defect Engineering, Plasma functionalisation

deepu.babu@msme.iith.ac.in



Dr. Suresh Kumar Garlapati

- Printed electronics (transistors and CMOS logics)
- Oxide Semiconductors
- Electrolytes
- Organic electronics (transistors and chemiresistors)
- Gas sensors
- Memristors

gsuresh@msme.iith.ac.in



Dr. Suresh Perumal

- Thermoelectric Materials, Metrology and Devices
- Magnetic Refrigeration
- Energy Storage devices
- Powder Metallurgy

suresh@msme.iith.ac.in



M.Tech Program (MoE Fellowship)

Department offers 2-years program in Master of Technology in Materials Science and Metallurgical Engineering. Students get opportunity to learn various advanced level courses and carryout thesis in various cutting-edge areas.

ELIGIBILITY:

Candidates having B.E./B.Tech. or equivalent in Metallurgy/ Ceramics/ Mechanical / Production / Industrial / Plastics / Polymer/ or related discipline or M.Sc. in Materials Science/Physics/Chemistry Valid GATE score required in MT/ME/PI/PH/CY/XE.

Contact for M.Tech Program (MoE Fellowship):

Dr. Suresh Perumal
Assistant Professor
Department of Materials Science &
Metallurgical Engineering
Email: suresh@msme.iith.ac.in
Phone: 7022565805

SELECTION PROCESS:

Based on GATE SCORE

APPLICATION PROCEDURE:

visit www.iith.ac.in for detail information and apply online

Glimpses of advanced level courses offered

- Properties of Materials
- Electron Microscopy
- Thermomechanical Processing Of Materials
- Advanced Physical Metallurgy
- Advanced Materials
- Thin Films Technology
- Advanced Materials Synthesis And Characterization
- Composite Materials
- Scientific Writing And Ethics In Research
- Materials For Green Energy
- Powder Metallurgy Manufacturing
- Introduction To Computational Methods In Materials Science
- Biomaterials- Materials In Medicine
- Polymer Science And Engineering
- Thermodynamics And Kinetics Of Materials
- Electrochemistry in Materials Science and Engineering
- Soft Materials
- Phase Transformations
- Hierarchical Nanostructured Materials
- Nature Inspired Materials Engineering
- 2D Materials: Synthesis, Characterization and Applications
- Wear & Triobology

M.Tech Program (Self-sponsored)

Department offers a new program in Master of Technology in Materials Science and Metallurgical Engineering. Students get opportunity to learn various advanced level courses in various cutting edge areas.

ELIGIBILITY:

Candidates having B.E./B.Tech or equivalent in Metallurgy/ Ceramics/ Mechanical/ Production / Industrial / Plastics / Polymer or related discipline. M.Sc. or equivalent degree in Materials Science/Physics/Chemistry or related discipline with minimum first class.

SELECTION PROCESS:

Written test (and/or) interview
GATE Score is not Mandatory

APPLICATION PROCEDURE:

visit www.iith.ac.in for detail information and apply online

Contact for M.Tech. Program (Self-sponsored):

Dr. Atul Suresh Deshpande
Associate Professor
Department of Materials Science &
Metallurgical Engineering
Email: atuldeshpande@msme.iith.ac.in

Glimpses of the courses offered

- Properties of Materials
- Electron Microscopy
- Thermomechanical Processing Of Materials
- Advanced Physical Metallurgy
- Advanced Materials
- Thin Films Technology
- Advanced Materials Synthesis And Characterization
- Composite Materials
- Scientific Writing And Ethics In Research
- Materials For Green Energy
- Powder Metallurgy Manufacturing
- Introduction To Computational Methods In Materials Science
- Biomaterials- Materials In Medicine
- Polymer Science And Engineering
- Thermodynamics And Kinetics Of Materials
- Applications of Electrochemistry in Materials Science and Engineering
- Soft Materials
- Phase Transformations
- Hierarchical Nanostructured Materials
- Nature Inspired Materials Engineering
- 2D Materials: Synthesis, Characterization and Applications
- Wear & Triobology