

List of PhD & M.Tech. Projects offered by MSE Faculty

Dr. Kantesh Balani

- ZrB₂-HfB₂-SiC based ultra-high temperature composites for re-entry space vehicles.
- Laser engineering of Hydroxyapatite based bone-implants.

Dr. Somnath Bhowmick

- Electronic and thermal transport properties of novel 2D materials like graphene, MoS₂ and phosphorene.
- Structure and electronic properties of amorphous semiconductors.
- Effect of surface and interfaces on thermal transport properties of materials using classical molecular dynamics simulations.

Dr. Krishanu Biswas

- The high toughness Hydroxyapatite-Titanium composite for Orthopedic applications
- Mechanical Behaviour and Processing Map of Novel High Entropy Alloys
- High Entropy Alloys for Thermoelectric applications
- Graphene- Nanoalloys : Synthesis of Novel Hybrids for Variety of Applications
- Nb-based Multicomponent alloys for compact high temperature reactors in atomic energy
- Phase Transformation of Free and Embedded Alloy Nanoparticles

Dr. Ashish Garg

- M.Tech: Solar cells based on organic semiconducting materials.
- M.Tech: Perovskite solar cells.
- M.Tech: Hybrid solar cells.
- M.Tech: Energy harvesting materials and devices.
- M.Tech: Magnetoelectric materials.
- PhD: Improving performance and stability of perovskite solar cells.
- PhD: Organic solar cells new donors and acceptor materials
- PhD: Novel multiferroic and magnetoelectric materials and thin film devices.

Dr. Deepak Gupta

- Flexible Electronic

Dr. Nilesh P. Gurao

- Cyclic plasticity of titanium alloys for aerospace applications using in-situ experiments.
- Length scale issues in metal plasticity: Understanding deformation behaviour of oligo, micro and nano crystalline materials.
- Mechanical Behaviour of High Entropy Alloys (in collaboration with Prof. K. Biswas).
- Circumventing the strength-ductility paradox in steels using gradient microstructures.

Dr. Sarang Ingole

- M.Tech: FeS₂ thin film based devices and characterization.
- M.Tech: Silicon nanowires for lithium ion battery.

Dr. Monica Katiyar

- Printable/Flexible OLEDs
- Printable/Flexible Batteries

Dr. Kaustubh Kulkarni

- Interdiffusion and diffusional interactions in high entropy alloy systems.
- Development of lightweight alloy forgings for automobile applications.

Dr. Tanmoy Maiti

- Organometal halide based lead-free environmental friendly solid-state perovskite solar cell with better stability and energy conversion efficiency.
- Double Perovskites and their composites for thermoelectric power generation.
- Focusing dynamics of plasmonic lens for near-field optical enhancement and nano-focusing.
- High entropy alloy for thermoelectric application (with Prof. K. Biswas).
- Perovskite material for solid oxide fuel cell cathode and anode (with Prof. S. Omar)
- Graphene based nano-composites (with Prof. K. Biswas)
- Modeling thermal transport properties of perovskites based thermoelectric materials (with Prof. S. Bhowmick)

Dr. Dipak Mazumdar

- M.Tech: Flows through Submerged entry nozzle (SEN) for wider slab casting.
- Ph.D.: CFD analysis and validation of multiphase, mixing flows during ingot and continuous casting of steel.

Dr. Rajdip Mukherjee

- Microstructure modelling of Ostwald ripening of second phase particles at grain boundaries.
- Microstructure modelling of phase separation in multicomponent alloys.
- Phase-field modelling of microstructure evolution in Dual Phase steel.

Dr. Sandeep Sangal

- Development of Stereological method
- Development of sintered multi-phase steel (with Prof. A. Upadhyaya)

Dr. Shashank Shekhar

- M.Tech: Development of Controlled-expansion (CE) alloys using non-melting route.
- PhD: Microstructural and mechanical characterization of high-silicon stainless steel.

Dr. Sudhanshu Shekhar Singh

- M.Tech: Continuous laser alloying of dissimilar components.
- M.Tech: Effect of microstructure on corrosion behavior of magnesium alloys.
- PhD: Additive manufacturing of aluminum alloys using SLM (selective laser melting) technique.
- PhD: Mechanical behavior of Al alloys at small length scale using nanoindentation.

Dr. A.K. Singh

- M.Tech: Modeling of Thermite Welding of Rails.
- M.Tech: Dynamic Modeling of Melting in Electric Arc Furnace.
- M.Tech: Modeling of pressure die casting operation.
- M.Tech: Modeling of coupled heat transfer and phase transformation in dual phase steel.
- PhD.: Experimental and numerical investigation on permeability of mushy region in metallic alloy systems.
- PhD.: Experimental and numerical investigation of Kinetics of degassing during RH-OB operation

Dr. Anandh Subramaniam

- Transmission electron microscopic investigations of nanoscale phenomena.
- Formation & Properties of Multicomponent metallic alloys (high entropy alloys).
- Computational studies of nanoscale structures and phenomena (e.g. finite element method).
- Hydrogen storage in nanostructures & applications (e.g. refrigeration).
- Mechanical behaviour of nanoscale hybrids.

Dr. Anish Upadhyaya

- M.Tech: Sintering Studies on Diamond-CNT Based Composites for Thermal Carrier Plates.
- M.Tech: Investigation of Supersolidus Sintering and Heat-Treatment Response of High Speed Steels.
- M.Tech: Thermo-mechanical treatment of Transient LPS Consolidated Bronzes.
- M.Tech: Investigation of Core-Rim Structured Heavy Alloys during Liquid Phase Sintering.
- M.Tech: Effect of Sintering on Interparticle Boundaries and Texture Evolution in Tantalum-Based Systems [with Prof. N. P. Gurao].
- PhD: Densification and Microstructural Evolution in Transient Sintering
- PhD: Microwave Sintering of Cutting Tools.

Dr. Vivek Verma

- Development of agar/agarose based material for chronic wound dressing applications. Material will have high absorbance capacity while being able to maintain strength and, possibly, deliver molecules of interest at the wound site.
- Development of material for osteochondral defects. Functionally graded materials are desired that can allow growth of bone cells on one side and chondrocytes on the other.
- Developing methodologies for sustained release of molecules especially drugs.
- Use of carbon materials (fibre, tubes and sheets) in developing packaging materials