Dear Recruiters,

With this open letter, I am enthusiastically recommending all our students: B. Tech, M. Tech, BT-MT (dual degree) and Ph.D for a job opportunity in your organization. The reason for this confidence in my students comes from the fact that at the entry point itself, these students are already top few percent of the national pool. When you combine that with the curriculum of Materials Science and Engineering (MSE) Department at IIT Kanpur and training in our various teaching and research labs, it means that our students are going to perform well in whatever career they choose to pursue. This is substantiated with achievements of our alumni in all sectors.

Our UG students do large number of courses to build their science and engineering base, some compulsory courses in MSE as major, and large number of electives in MSE and other Departments. This flexibility in the curriculum allows students to develop their interests. The professional MSE courses prepare students for jobs in many industries - automotive, aerospace, materials processing, iron and steel, non-ferrous, ceramics, health care, semiconductors, etc.

Our PG students are trained in solving problems related to materials and their processing using scientific methodologies. They are trained in state-of-the-art processing and characterization techniques, some of them are mentioned in this brochure. I am sure that they will be an asset to any industry or research organization.

Finally, the vibrant IIT Kanpur campus environment is conducive for development of personality and many soft skills in our students.

Wishing you and our students a very successful recruitment session.

Dr. Monica Katiyar
Professor and Head MSE,
IIT Kanpur
About Us

The Department of Materials Science and Engineering at IIT Kanpur strives to prepare technologists/engineers for developing new materials and processes for applications in variety of industries in metal and mining, automotive, chemical, aviation, plastic, biotechnology, semiconductor solar and energy sector.

The Department earlier known as Metallurgical and Materials Engineering was established in 1960. From its inception, it has had strong impact in providing knowledgeable manpower to meet the nation’s demand in traditional metallurgy. The department has reinvented constantly to keep the IIT curriculum in pace with the state-of-the-art technologies.

The field of study in the department now encompasses the entire spectrum of extractive metallurgy, physical metallurgy, manufacturing processes, electronic and semiconductor materials, biomaterials, ceramics and composites. This department has pioneered a unified approach to teaching and research, which has enabled us to evolve into an interdisciplinary field catering to diverse application.
Curriculum

Metallurgical Engineering
- Iron and Steel Making
- Principles of metal extraction and refining
- Phase Transformations
- Thermodynamics & Phase Equilibria
- Mechanical Behaviour of Materials
- Materials Failure: Analysis and Prevention
- Structure and Characterization of Materials
- Diffusion in Solids

Bio and Nanomaterials
- Introduction to Biomaterials
- Materials Science Technologies for Applications in Life Sciences
- TEM and Nano Analysis of Materials
- Nanostructures and Nanomaterials: Characterization and Properties

Materials in Manufacturing
- Materials Processing
- Selection & Design of Engineering Materials
- Manufacturing processes
- Solidification Processing
- Heat Treatment and Surface Hardening
- Powder Metallurgy
- Introduction to Lightweight Alloys

Electronics Materials
- Electronic Devices and Characterization
- Electro-ceramic Materials and Applications
- Computer Simulations in Materials Science and Technology of Thin Films and Device Fabrication
- Energy Materials and Technologies
- Materials for Semiconductor Industry
- Display Technology

UG Coursework
- Basic Sciences*
- Core Laboratories*
- Departmental Courses*
- Internship (2nd /3rd year)*
- B.Tech Thesis
- Teaching Assistantship
- Internship

PG Coursework
- Transport Phenomena*
- Thermodynamics*
- Structure and Characterization of Materials*
- Mathematical and Computational Methods*
- M.Tech/Ph.D Thesis*
- Teaching Assistantship*
- Internship

2020-21 Batch
- B. Tech 227 4 Years
- BT-MT 06 5 Years
- M. Tech 93 2 Years
- PhD 136 5 Years

Course work

www.facebook.com/mse.iitkanpur.9
www.twitter.com/IitMse
www.linkedin.com/in/mse-iit-kanpur-18236516b/
MSE department at IIT Kanpur is endowed with world class facilities which allow students to learn vital skills and obtain hands-on experience of latest technologies used both in industries and academia. Apart from the various testing and characterization laboratories, the department also houses befitting computational and modelling facilities in the domain of steel making, fluid dynamics and solidification processing. We have the following labs in our department:

### Microstructure Characterization Facility

| SEM APT | AFM | DSC/ TGA |
| TEM    | BET | XRD     |
| EPMA   | XPS |         |

### Physical Metallurgy and Engineering Metallurgy Lab

- Optical Microscopy
- Microwave Sintering Furnace
- Rolling Mill
- Welding
- Brazing

### Electronic Materials and Thin Film Processing Lab

- Pulse Laser Deposition
- Electron-Beam Evaporation
- Photolithography
- Clean Room
- Sputtering

### Material Testing Lab

- UTM
- Impact Testing
- Fatigue Testing
- Hardness Testing
- Creep Testing
- Microhardness Testing
Research Highlights

SAMTEL Centre for Display Technologies
To conduct R&D so as to nurture and support the growth of science and technology of electronic displays and to establish a tripartite relationship between industry, academia and governmental agencies.

National Centre for Flexible Electronics
It acts as a nodal point in India to bring academia, industry and public research organizations under one umbrella for research and development of large area flexible electronics

Industry Partners: Applied Materials, Manipal Technologies, Chain Electronics, Mathura Manufacturing

ACMS
Advanced Centre for Materials Sciences

ICME
Integrated Computational Materials Engineering is a National Hub at IIT Kanpur - A Joint IITK-TCS Initiative

Conferences/Workshopsheld in IIT Kanpur in the academic area 2019-2020
- 3rd International Workshop on High Entropy Materials
- Samsonov Memorial International Lecture series
- An in-house workshop on Clean Steelmaking and Tundish Metallurgy
- E C Subbarao Lecture Series
- Fundamentals and Characterization of Solar Cells (FUNSOL 2019)
- Research Scholar day “Padarth 2020”
- Mastering Advanced Techniques of Characterization for High-end Research
Research Areas

Health Care
Energy and Environment
Electronic Materials & Devices
Railways, Automobiles, Space and Defence technologies
Iron, steel & other metals

On Going Projects

- Steelmaking, Process Modelling
- Flexible electronics, materials and devices, semiconductor materials, Organic Electronics
- Computational Materials Science, Finite Element Method, Integrated Computational Materials Engineering
- Physical Metallurgy, Phase Transformation
- Environmental degradation of alloys
- Biomaterials, Protein Patterning
- Multi-component Diffusion, Thermodynamics
- Powder Metallurgy, Ceramic Processing, Sintering, Solid Oxide Fuel Cells
- Grain Boundary Engineering, Severe Deformation Processing
- Mechanical Behaviour of Materials
- Stereology, Crystallography
- Glassy Alloys, Quasicrystals
- Nanomaterials/ Composites
- 3D and additive Manufacturing
Indian Institute of Metals - Kanpur chapter organizes Materials Quiz workshops and conferences, involving student-faculty interaction

Material Advantage is a window providing access to the materials professional’s most eminent societies like ASM, TMS, AIST and Acers.

Materials Science and Engineering Society is an integral student body which organizes various departmental seminars, workshops, recreational activities

Industry Visit

Regular industrial visits to help students better understand the concepts and complexities involved in large scale productions.

Research Scholars Day

Students exhibit their research work by giving seminars and poster presentations.

Fun activities

Department outing, friendly volleyball & football matches among faculty & students
Kantesh Balani  
Ph.D (Florida International University, U.S.A)  
Specialization: Biomaterials, Ultra-high Temperature Ceramics, Nanocomposites, Energy Materials, Nanomechanics

Somnath Bhowmick  
Ph.D (I.I.Sc Bangalore)  
Specialization: Computational Materials Science

Krishanu Biswas  
Ph.D (I.I.Sc Bangalore)  
Specialization: Nanomaterials, Phase Transformation, Electron Microscopy, Graphene

Niraj Chawake  
Ph.D (Indian Institute of Technology Madras)  
Specialization: Fundamental and applied studies in the processing and properties of material systems for high temperature structural applications

Ashish Garg  
Ph.D (University of Cambridge, U.K)  
Specialization: Electronic Materials and devices

Anshu Gaur  
Ph.D (University of Illinois, U.S.A)  
Specialization: Electronic Materials, Nanomaterials, Device Physics and Device Characterization

Deepak Gupta  
Ph.D (University of California, Berkeley, U.S.A)  
Specialization: Displays, Oxide TFTs and Memories

Nilesh Prakash Gurao  
Ph.D (I.I.Sc Bangalore)  
Specialization: Crystallographic Texture, Thermomechanical Processing and Mechanical Behavior of Materials

Sarang Ingole  
Ph.D (Arizona State University, U.S.A)  
Specialization: Semiconducting Materials, Silicon Nanowires

Shikhar Krishn Jha  
Ph.D (University of Colorado, Boulder, USA)  
Specialization: Thermodynamics of phase transformations, Structure of material, Interfaces, and Solid state physics

Monica Katiyar  
Ph.D (University of Illinois, Urbana Champaign, U.S.A)  
Specialization: Opto-electronic Materials and Devices

Kaustubh Kulkarni  
Ph.D (Purdue University, U.S.A)  
Specialization: Multicomponent Diffusion and Phase Equilibria, Automobile Materials; Materials and Process Design

Tanmoy Maiti  
Ph.D (Penn State, U.S.A)  
Specialization: Electronic Materials, Thermoelectrics, Perovskites, Plasmonics

Dipak Majumdar  
Ph.D (McGill University, Canada)  
Specialization: Steelmaking, Modeling
Faculty

Kallol Mondal
Ph.D (IIT Kharagpur)
Specialization: Environmental Degradation, Physical Metallurgy, Steel, Glassy Alloys, Corrosion

Rajdip Mukherjee
Ph.D (I.I.Sc Bangalore)
Specialization: Microstructure Modelling and Simulations

Kanwar S. Nalwa
PhD (Iowa State University, USA)
Specialization: Organic and inorganic semiconductors, Perovskite based solar cells, Organic/Inorganic Tandem photovoltaics, Nanomaterials and thinfilms

Shobit Omar
Ph.D (University of Florida)
Specialization: Defect Chemistry in Solids, Oxygen Ion Conductors, Thermal Barrier Coatings, Solid Oxide Fuel Cell Technology

Sandeep Sangal
Ph.D (University of Maanitoba, Cana)
Specialization: Physical and Mechanical Metallurgy

Rajiv Shekhar (On Deputation: Director, IIT(ISM) Dhanbad)
Ph.D (University of California, Berkeley, U.S.A)
Specialization: Non-ferrous Extractive Metallurgy, Electrometallurgy, Concentrated Solar Thermal Power for Materials Processing, Electromediation of Heavy Metal Contaminated Soil

Shashank Shekhar
Ph.D (Purdue University, U.S.A)
Specialization: Thermomechanical Processing, Material Interface

Amarendra Kumar Singh
Ph.D (IIT Kanpur)
Specialization: Steel Refining and Casting, Extractive Metallurgy, Integrated Computational Materials Engineering

Sudhanshu Shekhar Singh
Ph.D (Arizona State University, U.S.A)
Specialization: 3D/4D Materials Science, Mechanical Metallurgy

Anandh Subramaniam
Ph.D (I.I.Sc Bangalore)
Specialization: Physical Metallurgy and Materials Science

Anish Upadhyaya
Ph.D (Penn State University, U.S.A)
Specialization: Powder Metallurgy, Sintering of Ferrous and Non-ferrous Alloys and Composites

Vivek Verma
Ph.D (Penn State University, U.S.A)
Specialization: Biomaterials, Protein Patterning, Biodegradable Materials

Gouthama
(Emeritus Faculty)
Ph.D (I.I.Sc Bangalore)
Specialization: Electron Microscopy, Physical Metallurgy

B B Agrawal
(Visiting Faculty)
Ph.D (I.I.T Kharagpur)
Specialization: Extractive Metallurgy

Kinnor Chattopadhyay
(Visiting Faculty)
Ph.D (McGill)
Specialization: Fundamentals of metallurgical thermodynamics, transport phenomena
Distinguish Alumni

Mr. Suresh Pandey  
(BT/MME/1965)  
(Former Director, Bokaro Steel Plant)  
(Management excellence)

Prof. Jagdish Narayan  
(BT/MME/1969)  
(Prof., Carolina State University)  
(Academic excellence)

Mr. Som Mittal  
(BT/MME/1973)  
(Former Chairman, NASSCOM)  
(Management excellence)

Mr. B. K. Shah  
(BT/MME/74)  
(Exec. Director, AIA)  
(Entrepreneurial Excellence)

Prof. Veena Sahajwalla  
(BT/MME/86)  
(Scienita Professor, UNSW)  
(Academic Excellence)

Dr. Pramath Raj Sinha  
(BT/MME/86)  
(Founder, Ashoka University)  
(Service of the society at large)

Collaborations

- APPLIED MATERIALS®
- BHUSHAN Bhusan Steel Limited
- Ministry of Steel
- PSA Airlines
- Ceiba
- ISRO
- Hindustan Unilever Limited
- DRDO
- INSERB
- TATA
- Sahasra Electronics Pvt. Ltd.
- mku®
- GM Global
- BARC
- Ministry of Education

Contact Us

DR. MONICA KATIYAR
Head of Department, MSE Department
head_mse@iitk.ac.in
Office: +91-512 259 7941

STUDENTS’ PLACEMENT OFFICE
109, Outreach Building, IIT Kanpur
spo@iitk.ac.in
Phone: +91-512 259 4433

DR. SUDHANSHU SHEKHAR SINGH
Student Placement Advisor
MSE Department
sudhanss@iitk.ac.in
Office: 0512-259-6908

DR. KALLOL MONDAL
Student Placement Advisor
MSE Department
kallol@iitk.ac.in
Office: 0512-259-6156

MR. KOTESH AJMEERA
Department Placement Coordinator
B.Tech.
kotesha@iitk.ac.in
+91-9652936084

MR. KOTTE VAMSHI KRISHNA
Department Placement Coordinator
M.Tech.
vamshi@iitk.ac.in
+91-9705586767