



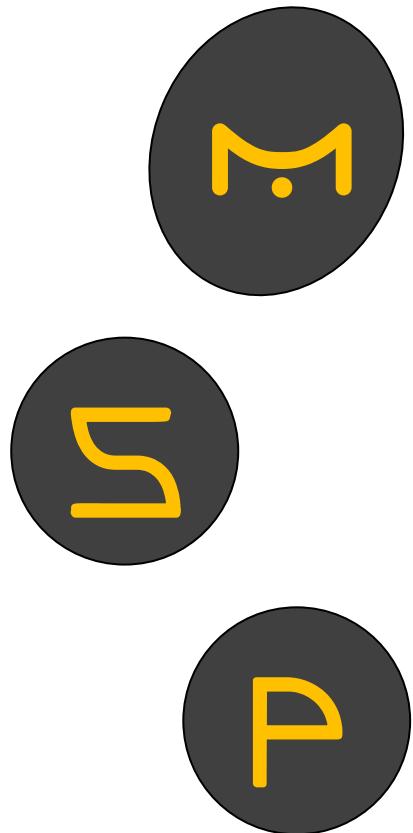
MATERIALS SCIENCE

**Materials Science Programme
Interdisciplinary Department
Indian Institute of Technology Kanpur
Kanpur - 208016**

**Class of '13
Recruitment Guide**



Students' Placement Office



Materials Science Programme

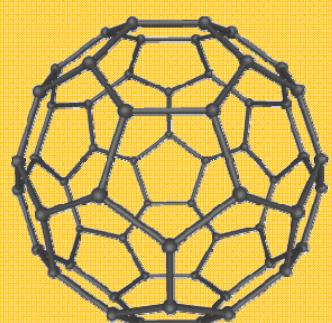
Features of M Tech

About the programme

The first Interdisciplinary programme in India, Materials Science Programme@IITK has been catering to the growing needs and expert requirements of the world since 1971. With an experienced pool of faculty leading talented students at both Graduate and Doctorate level, the programme offers one of the most holistic educational Centres in the nation. With excellent placement records and research publications, the programme is one of the most sought after in the country, mixing valuable ideals of Science and Engineering, Ethics and Human values.

Admission Procedure:

Admissions are held during the Summer of each year, with students from backgrounds of Physics, Chemistry, Mechanical Engineering, Materials Science Engineering, Polymer Engineering, Electronics and Communications Engineering, Electrical and Electronics Engineering, Ceramic Engineering, Chemical Engineering, and Biotechnology. The admissions are normalized according to competitive national tests like GATE, CSIR-UGC along with written exam and interview.



Course Overview

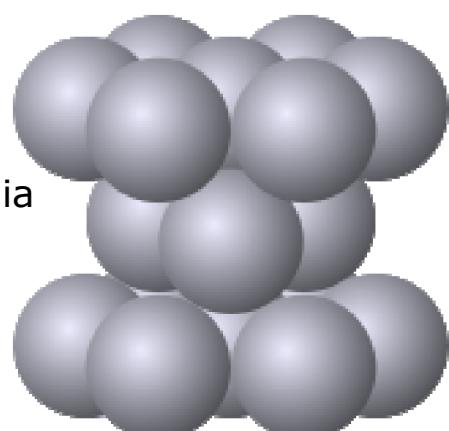
Students undergo a year of rigorous coursework which aids them during a year of research projects. The courses are designed to impart fundamental concepts as well as State-of-the-Art topics in Nanotechnology, Surface Phenomena, Energy Conversion, Behaviour of Materials, Condensed Matter Theory, etc...

Compulsory courses

- Structural and Magnetic Properties of Materials
- Electrical and Dielectric Materials
- Mechanical Behaviour of Materials
- Characterization of Materials
- Materials Engineering

Elective courses

- Electron Microscopy & Microanalysis
- Physics of Semiconductor Devices
- Mechanics of Highly Deformable Structures
- Cell & Molecular Biology
- Computational Number Theory And Algebra
- Advanced Engineering Electromagnetics
- Quantum Informatics
- Finite Element methods in Engineering
- Flow, Heat and Mass transfer in porous media
- Machining Science
- Surface Phenomena and Related Properties
- Materials for Energy Conversion Devices
- Crystal Growth Theory and Practice
- High Performance Polymers and Composites



* Featured image is the famous representation for Hexagonal Close Packed crystal structure, a part of coursework

Current topics of research include

- Nanotechnology, Nano-Materials Characterization
- Phosphors for Solid State Illumination
- MgO based systems for Plasma Display Panels
- ZnO transparent conducting oxides, Photo-Voltaics and Spintronic devices
- Multi-elements Perovskite-type Oxides membranes for Gas Separation
- Nature of Metal-Semiconductor Interface/ Schottky Junctions
- FIB fabrication of Nano-Devices
- Fast Ion Conductors/Superionic Conductors
- High Energy Batteries
- High T_c Superconductors
- Carbon Nanotubes
- Nano-structured Materials
- Functionally Graded Materials
- Materials for Fuel cell, Solar cells, Li-batteries
- Polymers
- Thermoelectric Materials
- Nanocomposites, Biomaterials



*Featured image at right is the Gecko, whose feet has very high adhesive strength. The natural Nano-Structured growth on its feet are shown in the left pane.



Faculty profile

A right mix of young and seasoned faculties manage State-Of-The-Art labs at Materials Science Programme. The programme is known for its holistic learning environment in the country and abroad.



Prof. D. C. Agrawal

- D.Sc, Columbia
- Ceramic Processing
- Structural Ceramics And Composites



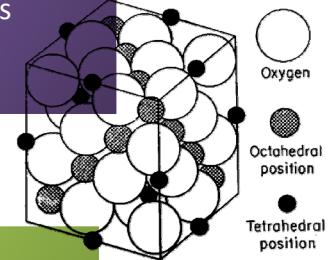
Prof. Rajeev Gupta

- Ph.D, IISc Bnglr.
- Experimental Condensed Matter
- Optical Spectroscopy



Prof. Kamal K. Kar

- Ph.D, IIT Kgp.
- Nanostructured Materials
- Functionally Graded Materials
- Solar Cells
- Fuel Cells



Prof. Jitendra Kumar

- Ph.D BHU
- Nanotechnology
- Electronic and Magnetic Recording
- Hydrogen Energy Storage Materials



Prof. Y. N. Mohapatra

- Ph.D IISc Bnglr
- Electronic and Optoelectronic Materials
- Hybrid Inorganic/Organic Devices



Prof. Keshav Shahi

- Ph.D GKP Univ
- Super-ionic/ Fast ionic conductors
- Solid Electrolytes
- High energy Density Batteries



Prof. S. Sivakumar

- Ph.D, Victoria
- Multifunctional La-doped Nanoparticles
- Polymer nanocapsules drugs
- La-Doped nanoparticle LED



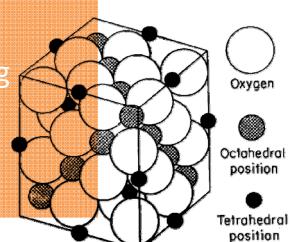
Prof. Ashish Garg

- Ph.D, Cambridge
- Ferroic And Multiferrioc Devices
- Thin Film Solar Cells
- Device Processing



Prof. Siddarth Pandya

- Ph.D, Houston
- Chemical Sensors
- Micro/Nano Fab
- Plasma Processing



Faculty profile



Prof. J.Ramkumar

- Ph.D, IIT Madras
- Micro/Nano Fabrication
- Novel Manufacturing



Prof. Malay K Das

- Ph.D, Penn State
- Electrochemical Energy Conversion
- Chemically Reacting Systems



Prof. Arun K Saha

- Ph.D, IIT Kanpur
- Turbulence
- CFD & Heat transfer
- Carbon Nanotube Modeling



Prof. S.Bhattacharya

- Ph.D, Missouri
- Bio-MEMS
- Lab-on-chip
- Nanotechnology



Prof. S S Gupta

- Ph.D, Virginia Tech
- Structural Mechanics
- Nanomaterial Mechanics
- Molecular Simulations



Prof. J Akthar

- Ph.D, Magdeburg
- Microwave Material Processing
- Computational Electromagnetics
- Electromagnetic Characterization



Prof. K.P.Rajeev

- Ph.D, IISc Bang.
- Expt. Condensed Matter
- Transition Metal Oxides
- Electronics



Prof. S.A.Ramakrishna

- Ph.D, RRI Bang./ JNU Delhi
- Optical And Condensed Matter
- Metamaterials/ Plasmonics



Prof. Manas Ghorai

- Ph.D, NCL Pune
- Synthetic Organic Chemistry
- Novel Method Devlopment



Prof. G.Anantharaman

- Ph.D, Goettingen
- Coordination Polymers
- Ionic Liquids
- Molecular Metal Oxides

Batch Profile

The present batch is composed of a right mix of fresh talent and experience, with a varied undergraduate background, true to the sense of interdisciplinary programme, bestowed with good academic track record, MHRD/ CSIR Financial Assistantships for Teaching as well as Research and major responsibilities in running the Institute.

- M.Sc, Physics
- Kumaun University
- Research: Organic Semiconductors and Chemical Sensors
- Work Experience: 24 months, Teaching

Amit Tewari



- B. Tech, Mechanical Engineering
- UP Technical University
- Research: Carbon Nanotubes Synthesis and Characterization

Amit Kumar Yadav



- B. E, Mechanical Engineering
- Anna Univ., Chennai
- Research: Numerical Modeling of Fuel Cell
- Internships: Autolec SF Ltd & IITM

Arjun Ravichandran



- B. Tech, Mechanical Engineering
- UPTU Lucknow
- Research: Fuel Cells Flow-Field Optimization
- Internships: CAPARO Ltd

Charchit Kumar



- B. Tech, Metallurgical Engineering
- NIT, Nagpur
- Research: Polymer electrolyte Batteries
- Work Experience :18 months, SISCO Ltd

Prashik Gajbhiye



- M.Sc, Physics
- DDU University, Gorakhpur
- Research: Synthesis of Nanocrystalline Silicon

Sandeep Kumar Singh



- M.Sc, Physics
- Lucknow University
- Research: ZnO Based Heterostructure Devices
- Work Experience: 15 months, Teaching

Shikha Srivastav



- B. Tech, Mechanical Engineering
- MDS Univ, Ajmer
- Research: Carbon Nanotubes
- Work Experience: 15 months, Teaching

Vinay Panwar

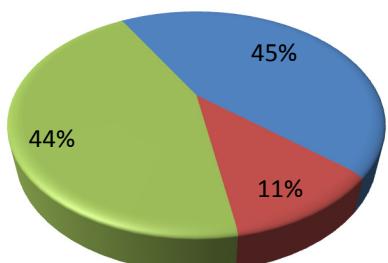


- M.Sc, Physics
- Lucknow University
- Research: Plasma Enhanced Synthesis of Nanocrystalline Silicon

Vinod Vishwakarma



Undergrad background

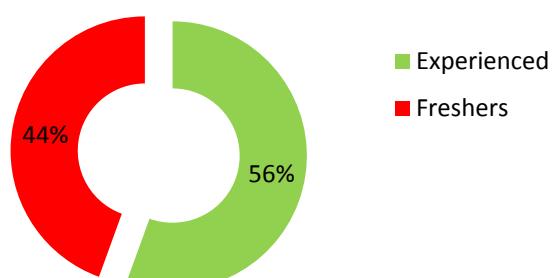


■ Physical Sciences

■ Metallurgical Engineering

■ Mechanical Engineering

Mix of Experienced and Fresh talent



■ Experienced

■ Freshers

Projects: 50

Project Name	Funding Agency
Study Of Chalcogenide Glasses For Application In Memory Devices	AOARD /PHY /20080066
Synthesis & Characterisation Of High Temperature Superconductors	Ministry of human Resource Development, India
High Performance Surface Engineered Carbon-Carbon Composite For High Temperature Applications	Department of Atomic Energy, India
Development Of Prototype Full Color Organic Light Emitting Diode (O-LED) Display	Department of Science and Technology, India

Patents by Students: 30

- Ahankari Sandeep Sureshrao And Animesh Biswas "Functionally Graded Wide-Band Polymeric Composites For Microwave Absorbers And Method Of Manufacturing Same" (2007)
- Ahankari Sandeep Sureshrao "Functionally Graded Polymer Nanocomposites/Composites Having Crosslinking Density Variation And Their Manufacture" (2007)

Laboratories:

- Advanced Nano-Engineering Materials Lab
- Materials Science Instructional Lab
- Optical Spectroscopy Lab
- Photonic And Electronic Materials Lab
- Solid State Ionics Lab
- Thin Films Lab
- Central Facilities

Major facilities available

Transmission Electron Microscope	Thin Film Preparation / Characterization
Electron Probe Micro Analyzer	Twin Roller
Scanning Electron Microscope	Atomic Force Microscope
X-Ray Powder Diffractometer	Iso-Static Press
Materials Testing Systems(UTM)	Fuel Cell Test Rig
Vibrating Sample Magnetometer	Rutherford Back Scattering Spectrometer
Vacuum Coating Units With E-Beam / Thermal Evaporation	Mossbauer Spectrometer, NMR, EPR
Ceramic Processing Facilities	Liquid Helium Plant
High Temperature Furnace	Faraday Balance
Diamond Saw	Spark Cutting Machine
Particle Size Analyzer	Differential Thermal Analyzer
Controlled Atmosphere Glove Box	Closed Cycle Helium Refrigerator
DC/AC, Two/Four Probe Resistivity Measurement Set Up (10-1800K)	PC Interfaced I-V Measurements(40-310K)
Impedance Analyzers (Agilent)	Deep Level Transient Spectroscopy
UV/Visible Spectrophotometer	TGA & DSC

Student Awards:

INAE Best Student Award

ASME Best Paper Award

Innovative Use of technology Award

Budding Researcher Award

Best Paper Award in various conferences



Students Speak:



IITK gave me a chance to rediscover my childhood curiosity in exciting science.
Ravi Sharma, Batch of '10



Materials Science @ IITK gave me a right mix of Engineering and Science to pursue my career in the Industry. Shikha Srivastav, Batch of '13

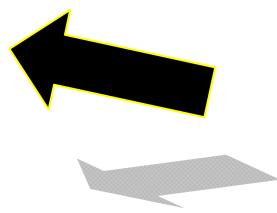
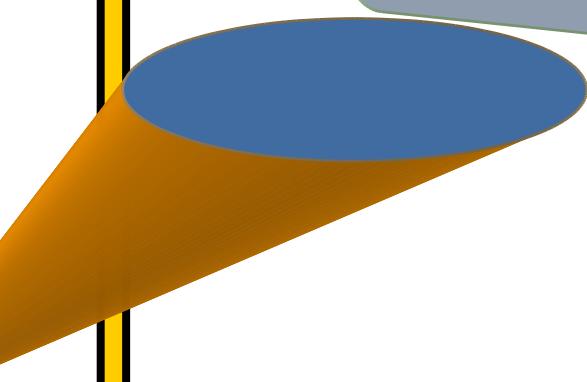


With world class facilities and faculty, one can experience interesting real world projects at hand, day in and day out.
Arjun Ravichandran, Batch of '13



A family environment, excellent professional networking and enlightening academics; I would recommend my friends to join MSP @ IITK for sure. Charchit Chauhan, Batch of '13

Interdisciplinary academics offered me to re-live my passion of research, in the pursuit of world class expertise. Amit Tewari, Batch of '13



Past recruiters:



Finisar



Schlumberger

ASHOK LEYLAND

SanDisk®

ABB

Battelle
The Business of Innovation

**RIO
TINTO**

moserbaer™

intel®

IBM



M.Tech Awarded: 150

Ph.D Awarded: 29



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