The growth of our civilisation has been critically dependent on materials which we have been able to harness for our technologies. The technologies of today use a large variety of materials with tailor-made properties, and stringent demands on performance much beyond that can be obtained from naturally occurring materials. Material Science Programme here at IIT Kanpur has a very strong interdisciplinary approach with both the student and faculty coming from different backgrounds. Our student intake is generally from engineering streams such as electrical, mechanical, materials, chemical and science streams of physics and chemistry. These students are put through a rigorous coursework giving them a solid grounding in fundamentals and application of material science. Subsequently, these students peruse independent projects with faculty members for their thesis in areas such as chemical sensors, Nano composites, batteries Nano materials, microwave, multi ferroic oxide. We believe that employers would find tremendous value in the training programme imparted here at IIT Kanpur.
Education here at IIT Kanpur is the prime focus of a student. The interdisciplinary programme in Material Science has a conglomeration of eminent faculties from physics, mechanical engineering, chemistry, chemical engineering and electrical engineering department guiding students towards their post graduate degrees. The interdisciplinary learning has succeeded the programme to accomplished a vast number of research publications and excellent placement record. The impetus behind the multifarious research in genres like semiconductor device modelling, multi ferroics, microwave absorbers, composites and chemical sensors is the need to develop novel material and products to satiate the growing demands of the world. Bringing together the innumerable components of science and technology and to get them working in tandem has been a key challenge and I am glad that the student have been able to embrace it well. I wish the students all the best for placement session of 2019-20.
Materials are at the root of man’s progress in the modern world. Advances in technology today are limited by the availability of newer materials with desired properties. Thus, the development of solar cell materials would make greater use of solar energy feasible, ceramic materials would make automobile and other engines lighter and more fuel efficient, optoelectronic materials would revolutionize the communication industry, etc. For this, a thorough study of existing materials and tailor making of new functional materials are to be continued with increasing vigor. Such a task, however, requires an integrated approach to the subject using established principles of science and engineering. Keeping this objective in view and to provide focus and coordination for teaching, research and development, an Interdisciplinary Programme in Materials Science was initiated at IIT, Kanpur at the postgraduate level in July 1971.
Selection Exam

Selection Criteria

GATE Score + IITK written test

Candidates are called from the following branches

- Material Science/Engineering
- Metallurgical Engineering
- Chemical Engineering
- Mechanical Engineering
- Electrical Engineering
- Electronics and Communication Engineering
- Ceramic Engineering
- Physics/Applied Physics
- Chemistry
Student's Profile

Mechanical Engineering [33%]
Chemical Engineering [13%]
Electrical & Electronics Engineering [13%]
Electrical Engineering [7%]
Plastics Engineering [7%]
Chemistry [7%]
Physics [7%]
Electronics & Instrumentation Engineering [13%]
Compulsory Courses

1. Structural and Magnetic Properties of Materials
2. Electrical and Dielectric Materials
3. Mechanical Properties of Materials
4. Characterisation of Materials
5. Engineering Materials
01 Materials Selection in Mechanical Devices
02 Computer Simulations in Materials Science
03 Charge and Heat transport in Semiconductors
04 Electromagnetic Interference and Compatibility Techniques
05 Physics of Semiconductor and Nanostructure
06 Introduction to Flexible Electronics
07 Principles of heterogeneous catalysis
08 Mathematics & Computational Methods
09 High Performance polymers and composites
10 Electronic Devices and Characterization
Phosphors for solid state illumination.
MgO based systems for plasma display panels,
ZnO based transparent conducting oxides for photovoltaics and spintronic device.
Materials for Fuel cell, Solar cell, Li-battery, High energy batteries
FIB fabrication of nano-devices
Polymer
Nanocomposites, Biomaterials
High Tc superconductors
Thermoelectric materials
Functionally graded materials
Nature of metal-semiconductor interface/ Schottky junctions,
Carbon nanotubes
Fast ion conductors/superionic conductors
Multi-elements perovskite-type oxides membranes for gas separation
Nanostructured materials
Facilities

- Transmission Electron Microscope
- Scanning Electron Microscope
- Rutherford Back Scattering
- PC Interfaced I-V Measurement (40-310K)
- Controlled Atmosphere Glove Box
- Mossbauer Spectrometer, NMR, EPR
- Fuel Cell Test Rig
- Vacuum Coating Units with E-Beam/Thermal Evaporation
- Liquid Helium Plant
- DC/AC, Two/Four Probe Resistivity Measurement Setup (10-1800K)
- Thin Film Preparation/Characterization
- Diamond Saw
- Ceramic Processing Facilities
- X-Ray Powder Diffractometer
- Deep Level Transient Spectroscopy
- LCZ Meter (Hewlett Packard Model 4276A)
- Precision Balance
- Twin Rollerand Isostatic Press
- Atomic ForceMicroscopy
- Null detector /Microvoltmeter (Keithley 155)
- Debye Scherrer, Oscillation and Laue cameras
- Electrophoresis Apparatus
- Programmable Electrometer/Source (Keithley 617)
- Electron Probe Micro Analyser
- SQUID (Super conducting quantum interference device)
- UV-VIS double beam spectrophoto meter (Hitachi150-20)
- Vibrating Sample Magnetometer
- Materials Testing System (UTM)
- Electro magnet (Polytronic model HEM-75)
- Rockwell - type Hardness Tester (Buehler Macromet 1)

- PECVD
- RF Sputtering Unit
- Raman spectroscopy
- Cryostat (Oxford Instrument)
- Moller Inter ferometer
- Minimet Polisher (Bueheler)
Laboratories

- Advanced Nano-Engineering Materials Lab
- Solid State Ionics Lab
- Electron Microscopy Lab
- Magnetic Testing Lab
- Surface Characterization Lab
- X-Ray Diffraction Facility
- Optical Spectroscopy Lab
- Indentation Lab
- Powder Size Characterization Facility
- Materials Science Instructional Lab
- Electrical Characterization Lab
- Photonic and Electronic Materials Lab
- BET, FTIR and BET Solar Simulator Facility
- Sample Preparation Lab
- Thermal Analysis Lab

- Live Cell Imaging Lab
- Mechanical Testing Lab
- Texture Lab
- Slow Strain Rate Testing Lab
- Central Facilities
- XRF-IRMS Lab
Past Recruiters

- ABB
- Samsung
- Applied Materials
- ATC Labs
- DAE
- Shell
- Asian Paints
- Oracle
- Intel
- HSBC
- Forbes
- IBM
Rajiv Arya
CEO. – Moser Baer Photovoltaic Ltd.

Amitabh Verma
VP. – Aditya Birla Management Corp. Pvt. Ltd.

Manvendra Bhangui
Head, Tagrem India Pvt. Ltd.

Ivan Saha
President and CTO
Vikram Solar
Materials are the basis of everything. They are required everywhere starting from developing of a prototype to manufacturing of the end product. Be it an electronic device or a mechanical device, all of them are made of different types of materials which must in one hand serve the actual purpose and secondly should also be compatible with each other. Thus for the same, one should have the sound knowledge of all the characteristics of the material i.e. mechanical, electrical, optical, thermal etc. Being an interdisciplinary department, students of Material Science Programme (MSP) are equipped with such skills related to all these fields so that he/she can easily manipulate and play with the properties of any material to make it useful for a given purpose. Students of MSP are exposed to both theoretical and practical based knowledge which allows them to solve critical problems in diversified areas such are those related to bio prosthetics, sensors, batteries, meta materials, micro processors etc. It is therefore in the year 1971, this interdisciplinary approach was started and was meant to address all kind of diversified problems, even those which are not covered under the scope of core departments.

Thus recruiting MSP graduates will give any company a new dimension in its growth and development.
DEPARTMENT PLACEMENT COORDINATOR

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