

Placement Brochure 2022-23



Department of Physics Indian Institute of Technology, Delhi

Contact Us

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About us

We are one of the largest departments in IITD having around 60 faculty members as of Jan 2022 having diverse interests. Our faculty strength is nationally and internationally recognized through many awards/fellowships such as SS Bhatnagar awards, ICO Galileo Galilei Awards, MRSI medals, AIP Fellowship, IRDC's STA Fellowship, INSA Fellows, OSA Fellows, Humboldt Fellows. Many of faculty members serve on the editorial boards and technical program committees of several international publications and conferences.

The Department has well-equipped teaching laboratories and an excellent research infrastructure. The research is broadly focused on topical areas like Condensed Matter Physics, Optics and Photonics, Plasma Physics, and Theoretical & Computational Physics. State-of-the-art research on contemporary topics like Nanoscience and Nano-technology, Energy Materials and Devices, Magnetism, Spintronics, Optical Fibers Sensors & Devices, Photonic Crystals, Optical Memory, Microwave and Laser-plasma Interaction, Quantum Optics Optical Imaging etc. is being carried out.

History and Vision

The Department initiated its activities in 1961 and is currently one of the most popular physics departments in the country. It has an international research reputation, with several research contacts and collaborations across the globe. The Department's greatest resources are the students that fill its classrooms and state of the art facilities that existed at IITD. The broad basic aim of the department is to impart a thorough knowledge in the basic fundamental principles of several branches of physics and their applications in technological world. Our students are ready to lead the next scientific and engineering innovations



Programs Offered

Undergraduate

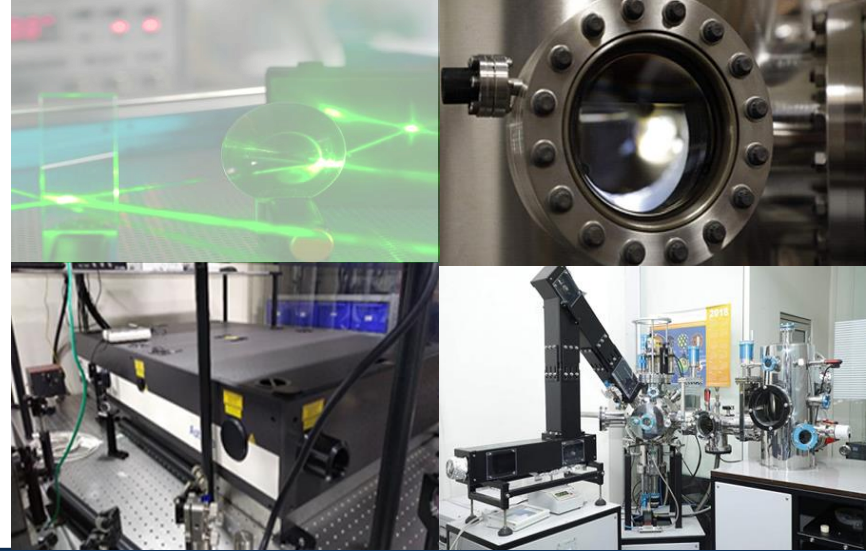
- B.Tech in Engineering Physics

Postgraduate

- M.Sc in Physics
- M.Tech in Solid State Materials
- M.Tech in Applied Optics
- M.Tech in Optoelectronics and Optical Communication (jointly with Electrical Engineering Department)

Curriculum

Curriculum of the department is very diverse and vast both in the domain of research to applied engineering Aspects. Following Courses are being taught in various Programs :



Optics and Photonics

- Photonic devices
- Fiber Optics
- Liquid Crystals
- Quantum Optics
- Green Photonics
- Non-Linear Optics
- Optical Electronics
- Optics and Lasers
- Green Photonics
- Integrated Optics
- Applied Optics
- Diffraction and micro optics
- Selected Topics in Photonics
- Fiber Optic Components and Devices
- Guided Wave Photonic Sensors
- Microwave
- Laser Spectroscopy
- Fourier Optics and Holography
- Biomedical optics and Bio-photonics

Condensed Matter and Semiconductor Physics

- Solid State Physics
- Semiconductor electronics
- Physics of Semiconductor devices
- VLSI Technology
- Energy Materials and devices
- Computational technique for solid state materials
- Nanoscale fabrication
- Characterization techniques for materials
- Electronic properties of materials
- Science and Technology of Thin Films
- Nanostructured Materials

Mathematical and Computational Physics

- Computational Physics
- Mathematical Physics
- Advanced Computational Physics

Quantum Mechanics

- Quantum Mechanics
- Quantum information and computation
- Quantum Heterostructures
- Statistical and Quantum Optics
- Quantum Information and Computing

Atomic and Nuclear Physics

- Atomic and Molecular Physics
- Nuclear and Particle Physics
- Magnetism and Spintronics

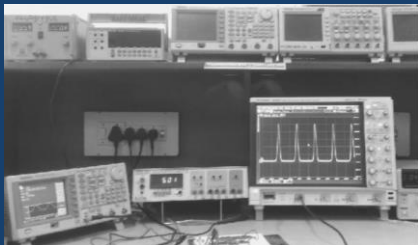
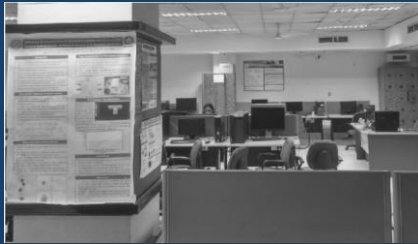
Plasma Physics

- Introduction to Plasmonics
- Nano-Photonics and Plasmonics

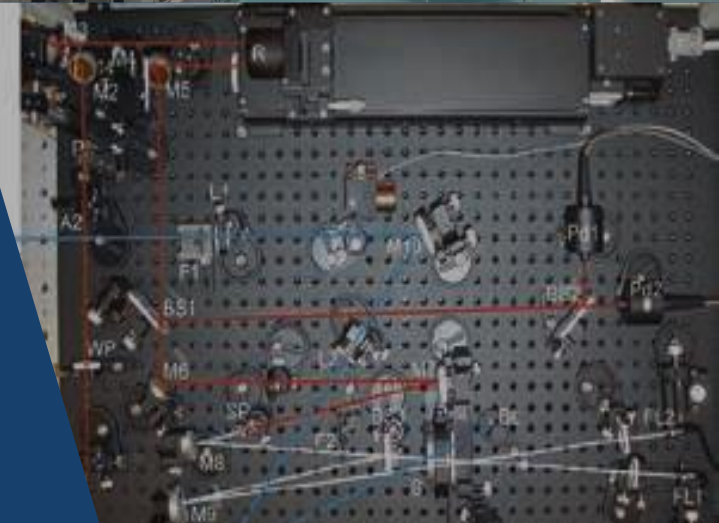
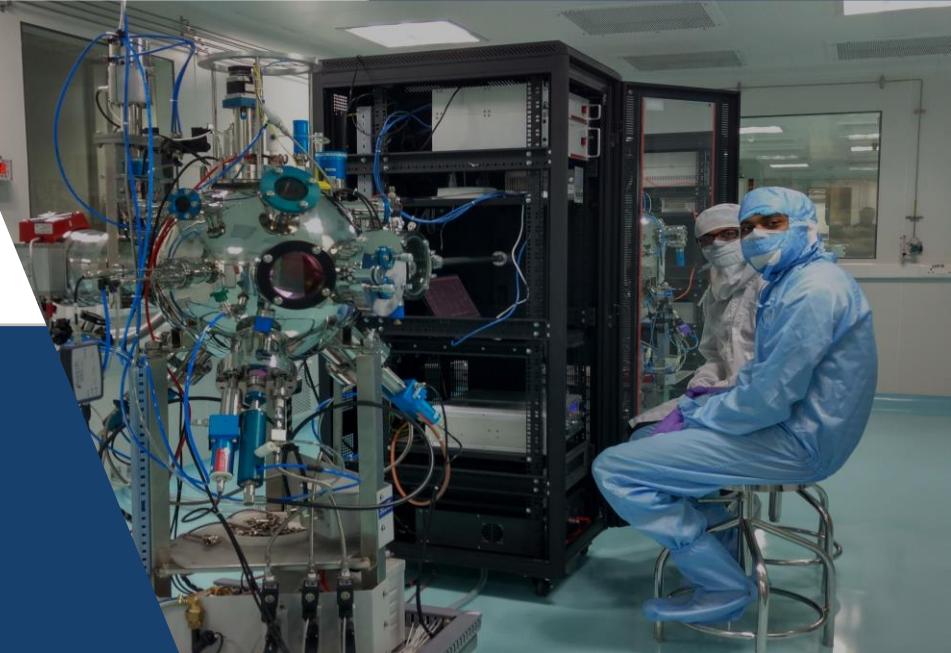
Other Important Subjects

- Microwaves
- Electrodynamics
- Vacuum Science and Cryogenics

Lab Facilities



Photonics Laboratory
Thin Film Laboratory
X-ray diffractometer
SQUID magnetometer
FTIR Spectrophotometer
VLSI Design Laboratory
Beam Plasma Laboratory
Plasma Physics Laboratory
Nanoscale research Facility
Ultrafast Optics Laboratory
AFM, STM, MOKE Microscope
Solid State Physics Laboratory
Ultra high vacuum coating unit
Laser Spectroscopy Laboratory
Photonics Research Laboratory
Quantum Electronics Laboratory
X-ray photoemission spectroscopy
Laser Raman Spectroscopy System
Closed cycle helium cryotip system
Optical Image Processing Laboratory
Fibre and Integrated Optics Laboratory
Nanoscience and Technology Laboratory
Magnetics and Advanced Ceramics Laboratory
Electron Microscopes (HRTEM, FESEM, TEM, SEM)
Electron Spectroscopy for Chemical Analysis (ESCA)



Research at the department

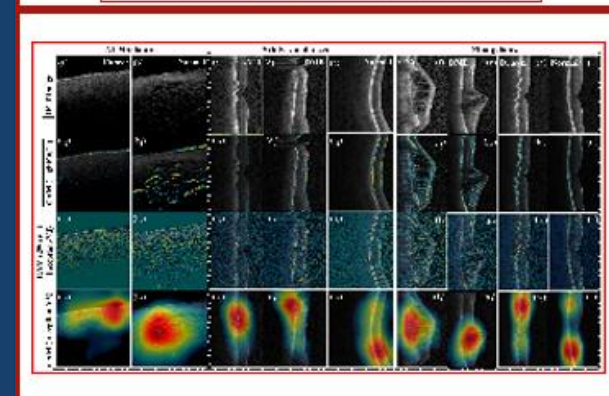
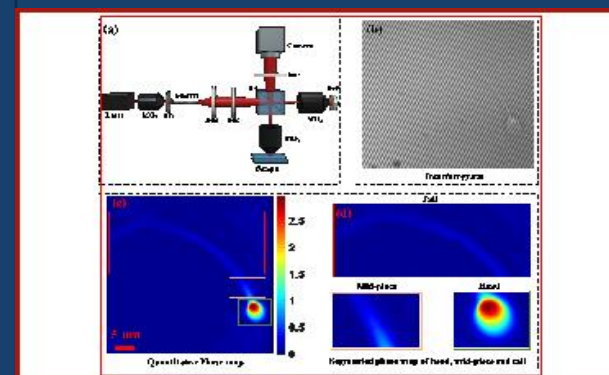
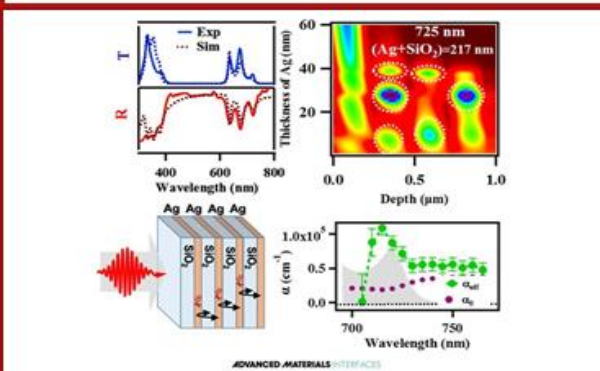
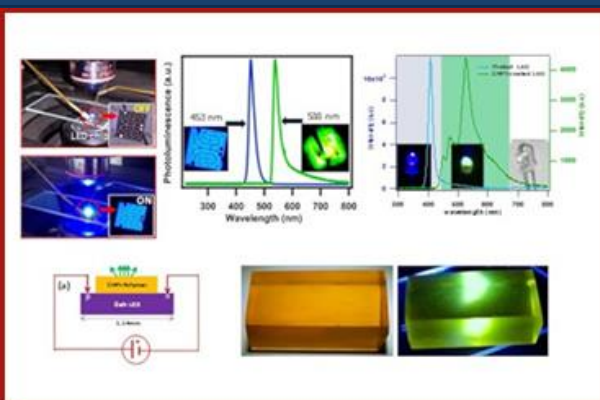
The courses are designed and taught by our internationally reputed academics carrying out cutting-edge research in diverse areas. Many optional modules are introduced from those research topics and the students work on projects which involve them working alongside academics in the advanced research laboratories of the department.



Research Funding in excess of Rs. 50 Cr. in the last 5 years. The Department attracts financial support from both Government and Private corporations.

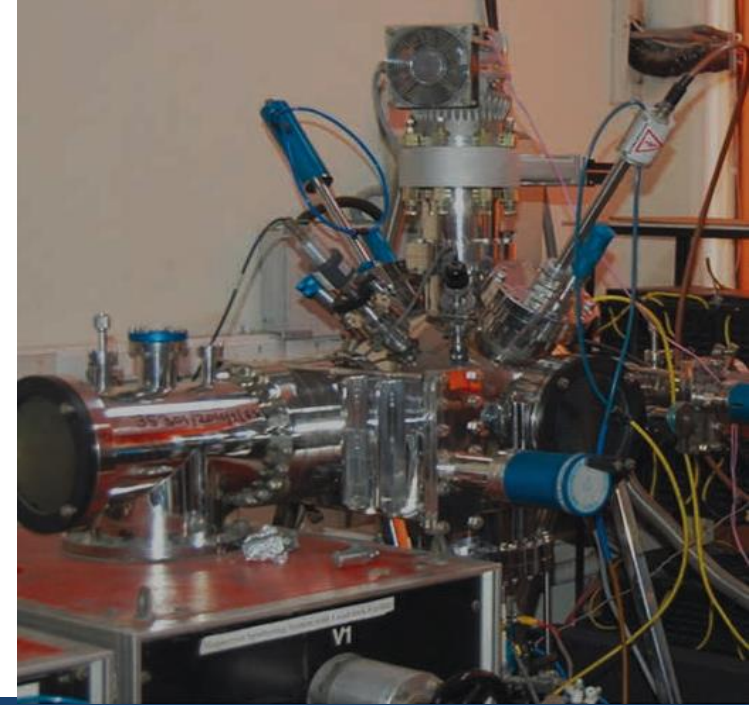
Research in our department is traditionally organized within the general areas of

- (i) Condensed Matter Experiments,
- (ii) Condensed Matter Theory
- (iii) Computational and Statistical Physics
- (iv) High Energy Physics
- (v) Plasma Physics
- (vi) Physics of Quantum Matter
- (vii) Optics and Photonics



| Research Fields

The exceptional research expertise of our faculty provides students a wide variety of research experiences. The highly rigorous undergraduate program prepares graduates to be competitive in top postgraduate programs or for employment. The PhD program and Master's degree programs blend demanding coursework with cutting-edge research to prepare graduates for jobs in academia, industry, and government labs. Our programs emphasize core academic competency and research excellence. Doctoral and Postdoctoral Research is carried out in following Fields :

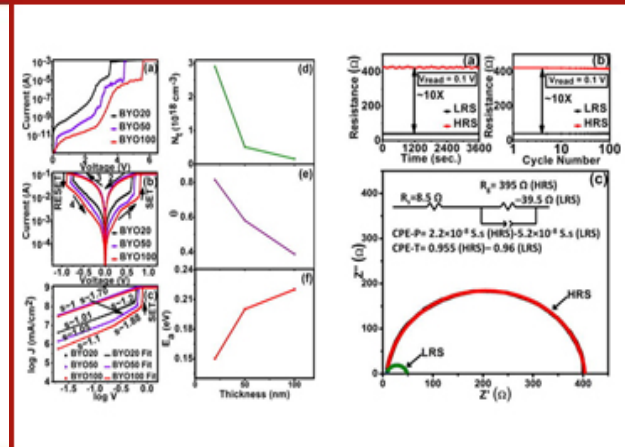
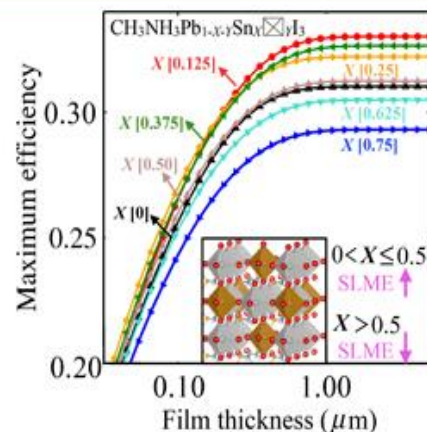


- **Materials and Condensed Matter Physics:** Thin Films, MBE, Materials and Devices, Novel Functional Magnetic Materials, Nanomaterials, Lattice Dynamics, Semiconductors and Amorphous Materials, Electronics Ceramics, Quantum Functional Materials, Superconductivity, Nano magnetism, Spintronics, Spin Dynamics, Charge Carrier Dynamics and Electronic Structure Studies of the Correlated Electron Systems, e.g., Fe-based high-Tc superconductors, Complex oxides, Materials for Nuclear Energy, Spectroscopic Imaging, Topological Insulators, etc.
- **Optics and Photonics:** Holography, High Density Data storage, Liquid crystals, Nonlinear Phase Conjugation, Optical Information Processing, Optical Data Security, Singular Optics, Nonlinear Optics, Nonlinear guided Wave Optics, Solitons, Quantum Optics, Fiber Optics, Integrated Optics, Fiber Optics Sensors and Biosensors, Fiber optics Components, Nanophotonics, Laser Spectroscopy and Applications, Terahertz Spectroscopy and Applications, Ultrafast Dynamics, Laser Processing and Fabrication, Green and Biophotonics, Photonic Metamaterials, Bio-Medical Imaging, Inverse Problems in Imaging, Optoelectronics, etc. .

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Research Fields

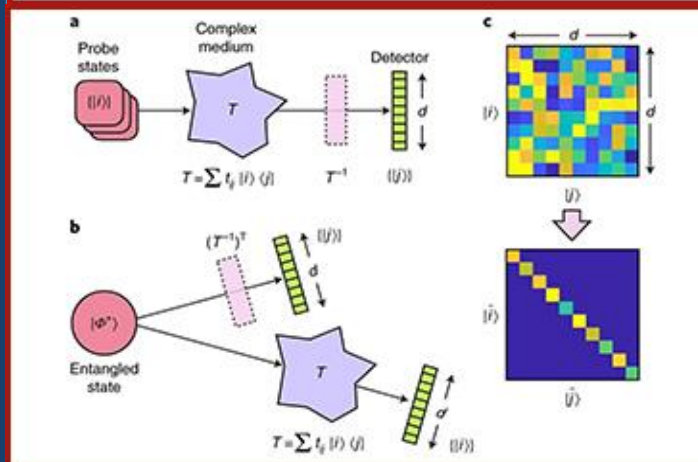
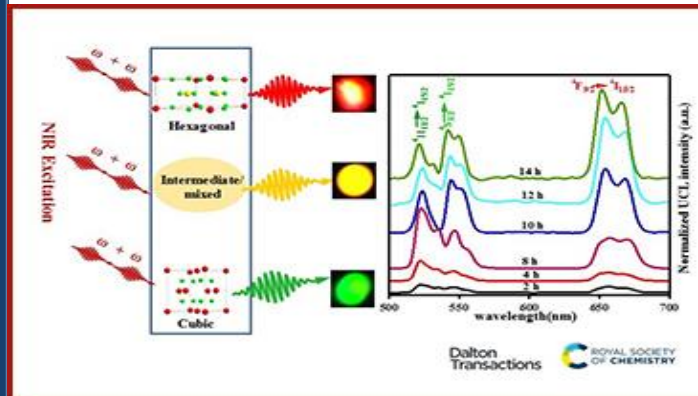
Doctoral and Postdoctoral Research is carried out in following Fields :



- **Plasma Physics:** Particle Acceleration, Nonlinear Waves and Instabilities in Plasma, Thermo Nuclear Fusion, Microwaves and Plasma Interaction, Solitons in Plasma, Space Plasmas, Terahertz (THz) Radiation Generation, Hall Thrusters, Interaction of Plasmas with Materials, Laser plasma interactions, Particle and Fluid Simulation in Plasma, etc.
- **Theoretical Physics:** Mathematical, Statistical Mechanics, and Computational Physics, theoretical Studies in ultra-cold atoms, Cavity Opto-mechanics with ultra-cold atoms, Nuclear Physics, Particle Physics, Ultrafast Optics. Soft Condensed Matter and Biophysics, Ion-atom collision Physics, Ion-irradiation of biologically relevant molecules, etc.
- **Computational Materials Science:** Designing Energy Materials, Thermal Transport, Electronic Structure, Band Engineering, Clusters and Catalysis, Pyroelectricity, Piezoelectricity, (Anti)ferroelectricity, (Anti)ferromagnetism, Multiferroics, Spin and Lattice Dynamics, Caloric Effects, Non-collinear Magnetism, Genetic Algorithm, Machine Learning, Force Field, Density Functional Theory, Kinetic Monte Carlo, Molecular Dynamics, etc.
- **Interdisciplinary:** Optical Spectroscopy under extreme conditions, High Pressure-High Temperature Physics, Energy Storage and alternative Energy Materials, CO2 sequestration, Mineral Physics, etc.
- **Multidisciplinary Research area: Nano-science and Technology:** A Nanoscale research Facility has been set up at IIT Delhi for developing Nanofabrication processes and their use for making nanoscale devices. In particular, the facility aims to focus on non-silicon based technologies, etc.

Key Research Projects

mentioned here are some of the key research Projects of the department :



- To synthesize size selected metal nano particles for plasmonic applications by gas phase and chemical methods
- Entanglement enhanced qubit generation for quantum informatics
- Robust laser beam engineering for propagation and imaging through turbulence
- DYNAMIC SPIN INJECTION AND SPIN-ORBIT TORQUES IN 2D-TRANSITION METAL DICHALCOGENIDES/FERROMAGNET HETEROSTRUCTURES
- Fabrication of high quality ohmic and Schottky contacts on Ga2O3
- Low Cost, Speckle Free Photo-Acoustic Tomography System for Non-Invasive Biomedical Studies
- Investigation of the Physical Properties of Cobaltate Hetrosturctures at Nanoscale for Energy Storage Applications and Electron-Correlated Materials
- Development of Time Resolved THz Imaging and Spectroscopy System for Studying High Energy Density Materials and Condensed Explosives under Functionalized Condition

- RE(Pd/Pt)Bi Thin films - A Multifunctional Experimental Platform for exploring Topological Quantum phenomena & Magnetism."
- Topology and Magnetism in Novel Quantum Materials.
- Doping-driven Tunable Multifunctionality in Half-Heusler Systems.
- The behavior of nanoscale magnetic skyrmions.
- Ultrafast carrier dynamics of different materials (THz probe studies)
- Light-Matter Interaction in SP2 Carbons.
- Isotropic and Anisotropic particle aggregation dynamics.
- Complex spin systems and emergent properties of magnetic nanoparticle assemblies.
- Profile and fluctuations of the proton from coherent and incoherent cross-sections of high-gluon density processes.
- Integrated sources of entangled photons for quantum communication and quantum information applications

Top Recruiters

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Cienna
Accenture
HCL
Ericsson
Infinera
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Axxela
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KPMG
HSBC Technology India
American Express
Barclays
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Hasura
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EY
Zomato
Oyo Rooms
Apple(Data Scientist)
Capgemini
One Plus
Reliance Jio
Etc.

HCL

Ecom Express

UPL

OpenAg™



cubastion®



SKILROCK

TECHNOLOGIES



EXL



GF

GLOBALFAIR



CISCO

™



PROTOTECH

SOLUTIONS

M.Tech Placements

- Cubastion
Consultancy Pvt. Ltd.
- Cisco
- EXL
- Global Fair

M.Sc Placements

- **Data Scientist :**
 1. Ecom Express
 2. UPL Ltd.
- **Senior Software Engineer :**
 1. HCL Technologies
- **Software Developer :**
 1. Proto Tech Solutions
 2. Skilrock Technologies

Placement 2021-22

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