Optoelectronics and Optical-communication is at the forefront of technological revolution in several key areas, which includes tele-communication, sensing, lithography, material processing, displays, photovoltaics, data storage, computing and artificial intelligence and microwave photonic chips. This has created an ever-rising demand in such industries, which lead to a globally growing need for highly skilled personnel trained in these interdisciplinary fields.

In India, such a trend has only recently gained momentum - as evidenced by the setting up of a Center for Excellence in Optics at one of the IT major companies due to heavy demand from their global Engineering Services clients. It is expected to be only a matter of time before this trend spreads around in the IT industry, creating a need for highly skilled work force. In addition, there are at least half a dozen small-scale companies that have been started in the past couple of years in India and they are also anticipated to grow over the next few years.

M.Tech Optoelectronics and Optical Communication (JOP) is an interdisciplinary postgraduate engineering course jointly offered by Department of Electrical Engineering and Department of Physics of Indian Institute of Technology Delhi (IITD). The course structure is developed in a balanced way to expose the student to both research and applicability of recent modern advancement in technology regarding this field. Recruitment data of previous year students indicates that students are placed in areas like VLSI, Machine learning, IT/Consultancies, Analytics, Telecommunication, Optical Networks, and R&D. Also, many have chosen to continue research and are engaged in PhD in many eminent Universities.
Curriculum

Department of Electrical Engineering

- Optical Communication System
- Digital Communication & Information System
- Advanced Digital Signal Processing
- Computer Communication Networks
- Broadband Communication Systems
- Access Networks
- Machine Learning
- Data Structure and Algorithm
- MOS VLSI Design
- Hardware Modelling of Digital Systems
- Telecommunication Switching and Transmission
- Wireless Optical Communications
- Photonic Switching and Networking
- Internet of Things
- Microwave Photonics
- Optoelectronic Instrumentation

Department of Physics

- Fiber Optics
- Optical Electronics
- Photonics Devices
- Optics and Lasers
- Green Photonics
- Integrated Optics
- Fiber Optic Components and Devices
- Guided Wave Photonic Sensors
- Fourier Optics and Holography
- Biomedical optics and Bio-photonics
- Ultra-fast Optics and Applications
- Statistical and Quantum Optics
- Introduction to Plasmonics
- Nano-Photonics and Plasmonics
- Selected Topics in Photonics
- Quantum Information and Computing
- Quantum Heterostructures
Our Labs

**Photonics Lab**
- Gigabit capable Passive Optical Network (GPON)
- Radio Over Fiber (RoF)
- Visible Light Communication
- Free Space Optics
- Optical Fiber based Sensor
- Optical Frequency Comb sources

**Optical Communication Lab**
- Intensity Modulation/Direct Detection
- Optical Communication Link
- Free Space Optics Link
- Dense Wavelength Division Multiplexing
- Optical Signal Processing
- Optical Spectrum Analyser
- Optical Time Domain Reflectometer (OTDR)
- Frequency Spectrum Analyser
- Dense WDM Kit (4 Channel)
- SDH Analyser

**Fiber Optics Lab**
- Refractive Index Profile Measurement
- Fiber Loss Measurement
- Splice Loss Measurement
- Variable Optical attenuator
- Acousto-Optic Modulation
- Sensors based on Microbending Loss
- Temperature Sensor based on Fiber Interferometer
- Gain Stabilisation of EDFA.

**VLSI Design Lab**
- PPM Implementation on FPGA using verilog
- Implementation of 64bit PRBS generator
- Digitally programmable delay element
- Xilinx Foundation Series
- Cadence Design suite
- Synopsys Synthesis Tools

**Internet of Things Lab**
- Cloud Computing, Software defined networking
- Data storage and mining
- Real time analytics, Machine Learning
- Wireless sensor networks
- Home automation
- Cyber and network security
M.Tech Project (2019-20)

Sponsored Projects

- Spectroscopic Investigation of Liquid Explosives - DRDO, Government of India
- Design of Communication Module for Optical Communication terminal for Nano satellites - ISRO Government Of India
- LiFi based Communication Networks - Ministry of Communication Dept. of Telecom, Government of India

Projects Under Dept. of Electrical Engg.

- Photonics analog to digital converters
- Design of a upper atmosphere stabilized balloon system with a weather sonde payload
- Study on underwater wireless optical communication
- Performance enhancement techniques for Free Space Optical Satellite Links
- Medium access control protocols for radio over fiber systems
- Machine Interfacing using LABVIEW for optical ranging
- Design of a fire resistant intelligent car system to assist firefighters
- Optimisation of Electro-optic Modulator based Frequency comb source using Machine Learning
- All-optical signal processing using space-time duality

Projects Under Dept. of Physics

- Design and development of fiber optic probe for Raman spectroscopy and fluorescence spectroscopy for in-vivo cancer detection
- Novel Chalcogenide glassed for mid-IR photonic integrated circuits
- Modelling and Characterisation of Multielectrode Semiconductor Lasers
- Study of nonlinear processes at telecom wavelength
- Coupling Characteristics of dielectronic-plasmonic waveguide couplers
- Optically-pumped Semiconductor Lasers
- Design of specialty fibers for THz applications
- Silicon nano wave-guides for quantum communication
- Perovskite Distributed Feedback Laser
- SERS based chemical sensors
Collaborations with Universities & Industries

We have collaborations with the following Universities all over the world:

- Ghent University, Belgium
- University of Applied Sciences, Duesseldorf, Germany
- Heriot Watt University, Edinburgh, UK
- Russian Academy of Sciences, Russia
- University of Strathclyde, Glasgow, UK
- University of Nice, France
- University of Limoges, France
- University of Jeans Monnet, France

Some of the projects which have been done in conjunction with the industries are:

- Real Time Fiber Optic Local Area Network (HBR NIFE Power System Ltd and MHRD)
- Implementation of SoC Interface for the system of Reflective Light Sensors (DRDO)
- Design of the OC-12 High Speed Optical Link with Tributary Multiplexing (AICTE)
- Mid Stage Accesses in EDFA (DIT, Optiwave Photonics)
- Fiber Grating (DIT) Development of IO Power Splitters/Combiners (MHRD, C-DoT)
- Fiber Optic Chemical Sensors (DIT) R&D on Optical Fiber pH Sensors by using Sol-Gel Technology (CSIR)
- Development of Fused Fiber Coupler Components (HBL NIFE power system ltd, MHRD, DIT)
- Design and Development of Array-of-Array MOEM based Free Space Optical Link for Ground to Satellite Communication Simulation and Analysis of System Design Requirement for Ground to Satellite and Intersatellite Free Space Optical Communication Links
Our Alumni

**Sunil Khatana**
Engineering Director  
Lumentum  
Milpitas, California, United States

**Rana Pratap Sircar**
Head of Innovation and Technology (Digital Services SDU, Quantum Computing, Ericsson India Global Services)

**Ravindra Kumar Sinha**
Director at CSIR-Central Scientific Instruments Organisation (CSIO)  
& Professor of Applied Physics, DTU (On lien)

**Debasish Banerjee**
President and Head of Business, IDEA cellular Infra. structure services ltd.

**Nitin Goel**
Optical Network Engineering and Architecture at Facebook  
Menlo Park, California, U.S.A.

**Pravin Joshi**
Director  
Fiber Optic Services  
Mumbai, Maharashtra
Recruitment Procedure

- Student-in-charge or placement officer, Training and Placement Cell shall provide the company a Job Notification Form (JNF)

- JNF requires details of the job offer - role offered pay package, place of posting, eligible departments

- Once the filled-in-JNF with all the required details is received, companies are assigned username/password to access their online account at http://tnp.iitd.ac.in

- Companies are also assigned space on the server on which they may upload any presentation, videos, data or other information they want the students to see

- The JNF has to be frozen on the T&P website by the company till a deadline

- Students shall be able to view all the details, and the eligible candidates may apply
Short-listed students get notified

The placement office allots the dates for the campus interviews

After the completion of the selection procedure on campus, company is required to announce the final list of the students on the same day itself

If a student is selected, the job is registered against him/her and he/she would not be allowed to appear for more interviews as per placement policy

RESUME VERIFICATION

All claims made by students in resumes submitted for campus placement are duly verified by the Placement Office. The verification standards are uniform throughout the Institute.
Top Recruiters

Industries:
- VLSI Industries,
- Optical Networking and Designing,
- Telecommunication,
- Analytics,
- IT/Consultancy,
- Research and Development,

Designations offered:
- SoC Engineer, RTL Engineer, Physical Design Engineer,
- Optical Design Engineer, Network Engineer
- Data Scientist, Software Engineer,
- Project Manager,
- Project Scientist and Researcher
Previous Year Placed Students

Amritanjan Kumar
RTL Design Engineer
Qualcomm

Jhalak Mittal
RTL Design Engineer
Qualcomm

Vipul Kumar Yadav
RTL Design Engineer
Intel

Sameeksha Varshney
SoC Design Engineer
Intel

Shrikant Sharma
FD Engineer
Qualcomm

Varun Arora
Network Engineer
Tejas Network

Vineet Nair
Engineer
MathWorks

Priyanshu Mishra
Engineer
MathWorks

Sonu Jaisawal
Engineer
Espressif System

Vivek Bharadwaj
PHD
University of Sussex

Bhawani Singh Rathore
Data Scientist
HCL

Harshvardhan Sharma
Network Engineer
Tejas Network

Vaibhav Arora
Optical Design Engineer
Varroc

Shiwani Sharma
PHD
CFEL, University of Hamburg
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