



Indian Institute of Technology Delhi
(IIT Delhi)

Executive Programme in Semiconductors, AI Computing, and Deep-Tech Entrepreneurship

Type

Executive Program

Mode

Online

Duration

6 Months

Total fees

₹ 130,000

Indian Institute of Technology Delhi (IIT Delhi)

Established in 1961 as an Institute of National Importance, the Indian Institute of Technology Delhi (IIT Delhi) is one of India's premier institutions for engineering, technology and research. Renowned for its academic excellence, innovation and global collaborations, the institute fosters interdisciplinary learning and industry-driven research. IIT Delhi is committed to developing future-ready professionals and leaders capable of driving technological advancement and societal impact.

Executive Programme in Semiconductors, AI Computing, and Deep-Tech Entrepreneurship

Highlights

- ◆ Build an integrated understanding of semiconductors, photonics, AI hardware and deep-tech entrepreneurship.
- ◆ Learn advanced concepts including CMOS, FinFETs, photonic integrated circuits and neuromorphic devices.
- ◆ Explore commercialisation pathways covering technology readiness, intellectual property, licensing and technology transfer.
- ◆ Engage with IIT Delhi faculty, industry experts, startup founders and investors through applied sessions and discussions.
- ◆ Participate in a two-day IIT Delhi campus immersion and earn an e-Certificate from CEP, IIT Delhi upon successful completion.

Learning outcomes

- ◆ Explain the fundamentals of semiconductor devices, photonics and emerging AI hardware architectures.
- ◆ Evaluate advanced technologies for applications in AI, high-performance computing and data-centre systems.
- ◆ Assess technology readiness, intellectual property and commercialisation pathways for deep-tech innovations.
- ◆ Develop go-to-market, funding and scaling strategies for semiconductor and photonics-based ventures.
- ◆ Communicate the technical and commercial value of deep-tech ideas through structured pitches and investor-focused proposals.

Eligibility Criteria

Any Graduate

Curriculum Overview

Module I: Semiconductor and Photonics Fundamentals for Deep-Tech (13 subjects)

- ◆ Semiconductor physics fundamentals
- ◆ Semiconductor diodes BJTs
- ◆ MOSFETs
- ◆ FinFETs
- ◆ Current status and future perspectives of electronic integrated circuits.
- ◆ Electronics versus photonics: Limitations and opportunities
- ◆ Motivation for photonic integrated circuits (PICs)
- ◆ PIC components: waveguides
- ◆ Resonators
- ◆ Couplers
- ◆ Optical modulators
- ◆ Photodetectors
- ◆ Current status and future trends of PIC technologies



Curriculum Overview (continued)

Module II: Advanced Semiconductor Electronic Devices for AI, HPC, and Data Centers (5 subjects)

- ◆ Advanced CMOS
- ◆ SOI
- ◆ FinFET Technologies.
- ◆ AI and Machine learning hardware: TPUs and GPUs.
- ◆ Neuromorphic and Memristor-based Devices: Brain-inspired computing for AI.

Module III: Advanced Semiconductor Photonic Devices for AI, HPC, and Data Centers (9 subjects)

- ◆ Data Center Infrastructure: Photonic interconnects
- ◆ Co-packaged optics
- ◆ Optical switching
- ◆ Energy- efficient hardware
- ◆ Scalable architectures.
- ◆ Hardware Accelerators for AI Workloads: Machine learning models
- ◆ Photonic matrix processor
- ◆ Different neural network architectures (CNN RNN DNN etc.)
- ◆ Real word applications of neural network for signal processing and image processing.



Module IV: Deep-Tech Entrepreneurship in Semiconductors & Photonics (24 subjects)

- ◆ From Lab to Market: Prototyping
- ◆ Manufacturing partnerships
- ◆ Productization.
- ◆ Overview of Deep-Tech Entrepreneurship: Ecosystem
- ◆ challenges
- ◆ Opportunities in hardware startups.
- ◆ Technology Readiness Levels (TRL): Moving from basic research to product development.
- ◆ Commercialization Models for Hardware: Fabless
- ◆ Semiconductor foundry partnerships
- ◆ System-level integration.
- ◆ Intellectual Property (IP) Strategy: Patents
- ◆ Licensing
- ◆ and tech transfer in semiconductor and photonics.
- ◆ Funding Deep-Tech Startups: Sources of funding (VC government grants)
- ◆ Angel investors
- ◆ Corporate R&D partnerships
- ◆ Scaling Semiconductor Startups: Production scaling
- ◆ supply chain management
- ◆ and cost optimization.
- ◆ Go-to-Market Strategies: Market fit
- ◆ Pricing
- ◆ Distribution
- ◆ Competitive differentiation.
- ◆ Building and Leading Teams: Effective leadership and talent acquisition for deep-tech companies.



Curriculum Overview (continued)

Module V: Case Studies & Industry Interactions (6 subjects)

- ◆ Case Study 1: TPU and AI hardware development
- ◆ Case Study 2: Photonic AI accelerators
- ◆ Case Study 3: Optical interconnects for data centers
- ◆ Case Study 4: Global semiconductor ecosystem
- ◆ Guest Lectures and Panel Discussions: Startup founders VCs and industry experts
- ◆ All case studies are based on publicly available information and independent academic analysis.

Module VI: Pitching and Fundraising for Deep-Tech Startups (4 subjects)

- ◆ Pitch Deck Creation: Building a compelling pitch for investors.
- ◆ Investor Expectations: What VCs and angel investors look for in semiconductor/photonics startups
- ◆ Funding Strategy: Choosing the right funding path for your startup (VC; angel investors; government grants).
- ◆ Mock Pitch Sessions: Practice pitching ideas to mock investors for feedback.

Capstone Project (3 subjects)

- ◆ Certification from IIT Delhi
- ◆ Key Competencies: Semiconductor device design; AI hardware architecture; photonics; commercialization strategies; Deep-tech entrepreneurship
- ◆ Networking: Access to IIT Delhi's incubators; investors; and industry networks

Fee Structure

Fee heads	Amount
Program Fee	₹ 130,000
Total	₹ 130,000