INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Short-course (Platinum Jubilee International Co-Teaching)

Chemical Processing and Thin-Film Growth of Semiconductor Materials

Precursors, Techniques, and Applications

COURSE DELIVERED BY

Prof. Dr. Dr. (h.c.) Sanjay Mathur — Institute of Inorganic Chemistry, Chair of Inorganic and Materials Chemistry, University of Cologne, Germany

About the Module

This 10-hour co-teaching module focuses on precursor chemistry and thin-film growth techniques: CVD, ALD, and PECVD- and their translation into functional semiconductor devices. This module, within the course "Compound Semiconductors" (MS60069), led by Prof. Ayan Roy Chaudhuri, is designed to work as a stand-alone short course. It exposes students, researchers, and industry participants to state-of-the-art materials and methods used across research and industry.

Lecture Schedule

Lectures 1–2	Thin Film Growth Techniques — Physical vs. Chemical Methods (PVD vs. CVD/MOCVD/ALD): kinetics, energetics, scalability, film quality
Lectures 3–4	Precursor Chemistry & Growth Mechanisms — self-limiting growth, catalytic reactions, decomposition pathways, and their influence on composition, defects, and uniformity
Lecture 5	Precursor Chemistries in Si-Ge Epilayers & Group III-V Semiconductors — opportunities and limitations

Course Outcomes

- Understand precursor selection, chemistry–functionality relationships, and reaction mechanisms
- Master thin-film growth strategies underlying CVD, ALD, and PECVD
- Analyze how processing parameters shape film structure, composition, and properties
- Connect fundamental chemistry to electronics, optoelectronics, and energy device applications

Who Should Attend

- Faculty & Research Scholars (Academia)
- Govt. of India Research Organisations
- Industry / R&D Professionals
- UG, MTech & PhD Students -Materials, EE, ECE, Nano Science, Physics, Chemistry

MODULE DATES

October 6–10, 2026

6:00 – 8:00 PM IST | 10 hours

REGISTER NOW

ERP Registration Link:

[TO BE ADDED]

Registration Fees

Category	Fee
Faculty from Academia	INR 5,000 + GST
Govt. of India Research Organisations	INR 7,000 + GST
Industry Professionals (incl. research labs)	INR 10,000 + GST
Students (other than MS 60069, Autumn 2026)	INR 1,000 + GST
Students of MS 60069, IIT Kharagpur (Autumn 2026)	NIL