PHY5045 Nanoscale Materials and Devices : Synthesis and Characterization

Course Code	PHY5045	Semester	
Course Title	*Nanoscale Materials and Devices : Synthesis and Characterization*		
Credits	3	Type	Elective

Course Outcome

It's another skill oriented course in which students will get hands on training on various aspects of wet chemical and physical deposition of nanostructures as well as high end sample characterisation tools.

Course Structure

General Synthesis approaches, Top Down and Bottom Up, Introduction to Thin Films and Superlattices, Wet chemical synthesis strategies : CBD, Dip coating, Spin coating, Spray pyrolysis, SILAR, Langmuir Blodgette, Vacuum Techniques : Physical deposition Techniques -Vacuum Evaporation, PLD, RF Sputtering, E Beam Evaporation , Chemical Vapor deposition Techniques, (CVD, MOCVD, PECVD), Molecular beam epitaxy, Lithography Techniques : **Top Down** – Photolithography, Direct Laser write lithography, Vapor phase lithography, Nanolithography, Nanoimprint lithography, E Beam lithography ; **Bottom Up** – Dip Pen and Fountain Pen lithography, Nanoscale devices- fabrication, introduction to NEMS, Characterisation Techniques, XRD, UV Vis, PL, Electrical, AFM, SEM, TEM

Suggested Books

1. W. Gaddand, D. Brenner, S. Lysherski and G. J. Infrate (Eds), Handbook of nanoscience, Engg. and Technology, CRC Press, 2012.
2. G. Cao, Naostructures and Nanomaterials: Synthesis, properties and applications, Imperial College Press, 2011.
3. J. George, Preparation of thin films, Marcel Dekker, InC., New York, 2005.
4. C. N. R. Rao, A. Muller, A. K. Cheetham (Eds), The chemistry of nanomaterials: Synthesis, properties and applications, Wiley VCH Verlag Gmbh & Co, Weinheim, 2015.