Elective course (Disciplinary)

EPH- 502: SYNTHESIS OF MATERIALS

UNIT-I

Physical Methods:
Solid State Reaction (Ceramic) Method: General Principles, Experimental Procedure: Reagents, Mixing, Container Material, HeatTreatment, Analysis, Kinetics of Solid State Reaction, Disadvantages.

Thin Film Synthesis:
Vacuum Evaporation, Sputtering, Spin Coating, Dip Coating, Pulsed Laser Deposition (PLD), Spray Pyrolysis, Chemical Vapour Deposition (CVD).

UNIT-II

Chemical Routes:
Sol-gel Method: Principle, Lithium Niobate (LiNbO3), Doped Tin Dioxide, Silica for Optical Fiber

Growth of Single Crystals:
Czochralski Method, Bridgman and Stockbarger Methods, Zone Melting, Precipitation from Solution or Melt; Flux Method, Epitaxial Growth of Thin Layers.
Vapour Phase Transport Methods.

References:
(1) Solid State Chemistry and its Applications, Anthony R. West (John Wiley & Sons)
(2) Solid State Chemistry – An Introduction, Lesley Smart and Elaine Moore (Viva Books Pvt Limited)
(3) Hand Book of Thin Film Technology, K. L. Chopra (MacGrow Hill)
(4) Thin Film Fundamentals, Goswami A. (New Age International)
(5) Hand Book of Thin-Film Deposition Processes and Techniques, Krishna Seshan (Noyes Pub.)
(6) Crystal Growth – A Tutorial Approach,Eds. W. Bradsley, D.T.J. Hurle & J. B. Mullin (North Holland)
(7) Crystal Growth Processes & Methods, P. Santhana Raghavan, P. Ramasamy (KRU Publications)