Composite Materials Credits: 4

INTRODUCTION; Definition – Classification of Composite materials based on structure – based on matrix, Advantages of composites – application of composites – functional requirements of reinforcement and matrix, FIBERS; Preparation, properties and applications of glass fibers, carbon fibers, Kevlar fibers and metal fibers – properties and applications of whiskers, particle reinforcements. MANUFACTURING OF ADVANCED COMPOSITES; Polymer matrix composites; Preparation of Moulding compounds and prepregs – hand lay up method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Manufacturing of Metal Matrix Composites; Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Manufacturing of Ceramic Matrix Composites; Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites; Knitting, Braiding, Weaving. RESPONSE OF COMPOSITES TO STRESS; (a) Iso Strain condition (b) Iso Stress condition (c) Load friction shared by the fibers.

TEXT BOOKS

1. Material Science and Technology – Vol 13 – Composites by Cahn – VCH, West Germany
2. Composite Materials science and Application –Deborah.D.L.Chung
3. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007

REFERENCE

1. Hand Book of Composite Materials-ed-Lubin
2. Composite Materials – K.K.Chawla
3. Composite Materials Science and Applications – Deborah D.L. Chung
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi