

ME607 Introduction to Composite Materials (3-0-0-6)

Introduction – classifications, terminologies, manufacturing processes (in brief). Macromechanical analysis of lamina – Hooke's law for anisotropic, monoclinic, orthotropic, transversely isotropic and isotropic materials–2D Unidirectional and angle ply lamina – Strength theories of lamina. Micromechanical analysis of lamina –Volume and mass fraction, density and void content – Evaluation of Elastic moduli, Ultimate strength of unidirectional lamina. Macromechanical analysis of laminates – Laminate code, Stress strain relations – In-plane and Flexural modulus, Hygrothermal effects. Failure Analysis and Design – Special cases of laminates, symmetric, cross ply, angle ply and antisymmetric laminates, failure criteria and failure modes

Textsbooks/References

- [1] Jones, R M, *Mechanics of Composite Materials*, Scripta Book Co.
- [2] Agarwal, B D and Broutman, J. D, *Analysis and Performance of Fiber Composites*, New York, John Willey and Sons, 1990
- [3] Mallik, P. K, *Fiber reinforced composites : materials, manufacturing and design*, New York- Marcel and Dekker, 1993 (2nd edition)
- [4] Arthur, K Kaw, *Mechanics of Composite Materials*, CRC Press, 1997.
- [5] Reddy J N, *Mechanics of Laminated Composite Plates*, CRC Press
- [6] Mallik, P. K, *Composite Engineering Hand Book*, New York, Marcel and Dekker, 1997 (2nd edition)