AE801 COMPOSITE MATERIALS, MECHANICS AND MANUFACTURING 3-0-0-3

Introduction to composites, Construction/ classifications of composites, Materials for composites, Introduction to fibrous composites, Properties of unidirectional / bi-directional composites, Short fiber composites, Destructive and non-destructive testing on composites, Failure mechanisms and lamina failure theories. Physicho-thermal and thermo-mechanical characterization of composites. Scope of high performance polymer based composites. Different environmental effects on composites and long term durability. Scope of electrically conductive polymeric composites. Classical lamination theory, Hygrothermoelastic lamination theory, Designing of different types of laminates, Problems on determining the resultant forces, moments, stresses and strains in the laminated composites, Interlaminar stresses, Impact on composites, Application of fracture mechanics techniques on composites, composite joints. Discussions on carbon-carbon, Metal matrix, ceramic matrix and Hybrid composites, Introduction to Nano composites, 3D Composites and Stitched composites, Manufacturing techniques of composites: Open moulding process, close moulding process and continuous fiber processing, Prepreg technology and processing of composites.

TEXT BOOKS/REFERENCES:

1. Robert M. Jones, "*Mechanics of Composite Materials*", Taylor and Francis, 1999.

2. Mallick P. K. "*Fiber Reinforced Composites Materials Manufacturing and Design*", Third Edition, CRC Press, 2007.

3. Bhagwan D. Agarwal, Lawrence J. Broutman and K. Chandrashekhara, "*Analysis and Performance of Fiber Composites*", Wiley India Pvt Ltd, 2012.

4. Halpin J. C. "*Premier on Composite Materials Analysis*", Techomic Publishing Company, 1992.