

## **OPT551 FIBRE REINFORCED PLASTICS**

### DETAILED SYLLABUS

#### **OBJECTIVES:**

To enable the students

- To introduce the various materials for composite structure.
- To equip with the knowledge of sandwich structure technology.
- To provide knowledge in fracture mechanics of composites.
- To impart knowledge in fatigue and damping capacity of composite materials.
- To provide understanding of various manufacturing/fabricating techniques for composite structures

#### **UNIT I**

**Introduction:** Definition, Reason for composites, Classifications of composites, Thermosets - Epoxy; Unsaturated polyester resin; vinyl ester, polyimides etc., - preparation, properties, and uses.

#### **UNIT II**

**Reinforcements;** Types, Properties, chemistry and applications of fillers such as silica, titanium oxide, talc, mica etc., Manufacturing process, Properties, structure and uses of Glass fiber-. Carbon, Aramid, Boron, jute, sisal, cotton

#### **UNIT III**

**Fabrications of Thermoset composites** – Hand layup method, compression and transfer moulding, pressure and vacuum bag process, filament winding, protrusion, reinforced RIM, RRIM, Injection moulding, of thermosets, SMC and DMC, Advantages and disadvantages of each method.

#### **UNIT IV**

**Testing of composites-** destructive and non-destructive tests; Destructive- tensile, compression, flexural, impact strength, Hardness – Fatigue- toughness HDT, basic concepts of fracture mechanisms

#### **UNIT V**

**Applications of composites** – aerospace, land transport, marine, structural, chemical plants and corrosion resistant products, mechanical engineering and energy applications sports, electrical, electronic and communication applications, biomedical applications, repairs and maintenance etc.,

**OUTCOMES:**

Upon completion of this course, the students will be able to

- Select various materials for designing composite structures.
- Apply knowledge of fracture mechanics of composites during designing of composite structures.
- Analyze critically the damping capacity of composite materials.
- Correlate various manufacturing/fabricating techniques for composite structures based on design

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