

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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3. Engineering Plastics and Composites by John C. Bittence, 1990
4. Handbook of Plastics, Elastomers and Composites by Chrles A Harper, 1975
5. Designing with Reinforced composites- Technology-Performance, Economics-Rosato, 2st Ed. 1997.
6. Delwane Composite design Encyclopedia – (Vol 3 Processing and Fabrication / Technology _ Ed. Leif Carlssen. And Joahn W. Hillispie, Technomic Publishing Ah. Lancaster U.S.A.
7. Fiber glass Reinforce Plastics – Nicholas P. Cheremisinoff and Composites Paul N. Cheremmisinoff.,
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SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

Notes

Syllabus

Question Papers

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9. Composite applications – the future is now, Thomas J. Drozdr, (Eds), Published by Society of Manufacturing Engineers, Michigan, 1989.

10. Polymer layered silicate and silica nano composites, Y.C. Ke, P. Stroeve and F.S. Wang, Elsevier, 2005