

COMPOSITES AND BLENDS

PREPARED BY
MANISH ASALMOL

UNIT-1 → FUNDAMENTALS OF COMPOSITES.

CO-1 → Understand role of constituents of composites.

LO-1 → Identify constituents of composites.

CONTENT → Definition of composites, its main elements, their role, example - Resin system, Reinforcement.
 Classification of composites.
 Advantages of Composites.
 Curing agents for Matrices, Accelerators, Inhibitors
 Coupling agents, Release agent - their role & examples.

Method of Assessment → Internal Mid Sem Test - 1

Hours → 07

Marks → 10M

LO-2 →

→ Enlist the properties & applications of different matrix.

CONTENT → Properties & applications of unsaturated polyester, Epoxy, Vinyl esters, phenolics.
 Properties & applications of Polyimides, PC, PP, polyamides.

Method of Assessment → External Theory Exam

Teaching Hours → 08

Marks → 10M

LO-3 → To measure density & ^{water absorption} moisture in Plastic industries.

CONTENT → Determination of density of FRP specimen -
 Determination of water absorption by composites.

Method of Assessment → External Practical

Teaching Hours → 08H

Marks → 10

CO-2 → To select suitable fibre material.

LO-4 → To compare different fibre materials.

CONTENT → Fibre & its applications,
Molecular requirement of fibre forming polymers,
Difference between Natural & Synthetic fibres.
Advantages & limitations of synthetic fibres.

Method of Assessment → External theory Exam

Teaching Hours → 07

Marks → 10M

LO-5 → To describe manufacturing, properties & applications of various fibres.

CONTENT → Manufacturing, properties & applications of Aramid fibres, Boron fibres.
Manufacturing, properties & applications of Glass fibres, Boron fibres.
Manufacturing, properties & applications of Carbon fibres, Graphite fibres.

Method of Assessment → External Theory Exam

Teaching Hours → 08

Marks → 10M

LO-6 → To measure the matrix & fibre content in composite industry.

CONTENT → Determination of Matrix & fibre content of composites.

Method of Assessment → Internal Practical

Teaching Hours → 06H

Marks → 10

CO-3 → To select suitable Reinforcement & curing system.

LO-7 → Predict effect of loading & orientation of fibres.

CONTENT → Types of reinforcements.

- Effect of loading & orientation on strength of composites.
- Manufacturing of Hybrid & Sandwich composites.

Method of Assessment → Internal → Assignment, Quiz, Surprise Test.

Teaching Hours → 7 Marks → 10M

LO-8 → Understand the ~~different~~ concept of different curing system.

CONTENT → Curing Systems →

- The process of curing,
- Curing agents for Polyester systems.
- Curing with accelerators.
- Curing without accelerators.
- Selection of a curing systems.
- Prepregs & moulding compounds - SMC, BMC.

Method of Assessment → External Theory Exam

Teaching Hours → 8 Marks → 10M

CO-4 → To select suitable process for production of composite products.

LO-9 → To describe constructional features & working of the various processing techniques of composite products.

CONTENT → Various Processing Techniques :-

- Hand lay-up method
- Spray up method
- Vacuum Bag Moulding
- Pressure Bag Moulding
- Autoclave Moulding

Method of Assessment → External Theory Exam.

Teaching Hours → 10H

Time → Marks → 10M

LO-10 → To describe the working of the various processing techniques of composite products.

CONTENT → Matched Die Moulding,

- Pultrusion,

- Filament winding,

- Centrifugal Casting,

- Continuous sheet manufacturing.

Method of Assessment → External Theory Exam

Teaching Hours → 08

Time → Marks → 10M

LO-11 → To describe troubleshooting & uses of composites.

CONTENT → Common faults observed in composites & their remedies.

- Applications of composites in sports, construction, automobile, Aerospace, Telecommunication, Marine, etc.

Method of Assessment → External Theory Exam

Teaching Hours → 05

Time → Marks → 05M

LO-12 → To prepare a composite product by using Hand-lay up process in plastic industry.

CONTENT → Preparation of Polymer composite product by Hand-lay up process.

Method of Assessment → External Practical

Teaching Hours → 08H

Time → Marks → 10

LO-13 → To prepare a report on applications of FRP.

CONTENT → Report on applications of FRP.

Method of Assessment → External Practical

Teaching Hours → 07 H

~~Time~~ Marks → 10

CO-5 → To acquire the basic knowledge of Polymer blends.

LO-14 → To understand the basic concept of polymer blends.

CONTENT → - Definition & significance of Polymer blends.

- Miscible Blend, Immiscible blends.

- Criteria for Miscibility.

Method of Assessment → Internal Mid Sem Test - 2

Teaching Hours → 07 H

~~Time~~ Marks → 10 M

LO-15 → Enlist the properties & applications of Polymer blends.

CONTENT → Properties & applications of commercial polymer blends such as :-

PVC-NBR, ABS-PP, PP-EPDM, & PPO based blends.

Method of Assessment → External Theory Exam

Teaching Hours → 05

~~Time~~ Marks → 05 M

LO-16 → Understand the concept of polymer blend.

CONTENT → ~~Re~~ Study the preparation of Polymer blend, Processing of polymer blend.

Method of Assessment → Internal Practical

Teaching Hours → 06 H

~~Time~~ Marks → 10 M