GUJARATTECHNOLOGICALUNIVERSITY

Program Name: Engineering

Level: PG

Branch: Plastic Engineering

Course/Subject Code: ME01084061

Course/Subject Name: Polymer Composites

w.e.f. Academic Year:	2024-25
Semester:	1st Semester
Category of the Course:	PEC

Course Outcome:

After Completion of the Course Student will able to:

No	Course Outcomes
01	List the advantages and limitations of FRP and identify material and process selection criteria.
02	Describe types of resins and reinforcements used in FRP
03	Explain FRP molding processes and compounding techniques.
04	Prepare samples using FRP process and analyze various applications of Composites.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	PR	C	ESE (E)	PA/ CA (M)	PA/CA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No.of Hours	%of Weightage
1.	**Introduction-** Composites-Classification - Advantages of FRP –Role of resin and reinforcements -Applications of FRP. Designing in FRP: Selection criteria - material and process selection	6	5
2.	**Resins for composites:** Manufacturing, properties and applications of Polyester resins, Epoxy	10	25

	resin, Phenolic resins, Vinyl ester resins, Alkyd resins		
3.	Catalyst and Accelerators for unsaturated polyester resins, Reactive diluents- Non-reactive diluents for Epoxy resin, Curing Agents for Epoxide Resins	7	15
4.	**Reinforcements for Composites :** Surfacing tissue –Glass fiber –Preparation, various forms and types, properties and applications, Carbon fiber- Preparation, properties and applications, Aromatic polyamide (Aramid) fibers- properties and applications, Polyester fibers, Polyacrylonitrile fibers, Natural fibers: Cotton , sisal, jute, coconut, banana etc.	7	20
5.	**Processing of Composites** : Hand lay-up technique, spray-up technique, vacuum bag molding, pressure bag molding, resin transfer/injection molding, centrifugal casting, pultrusion, filament winding, Sandwich construction, Continuous sheet manufacturing **Moulding compounds** – Dough and bulk molding compounds (DMC & BMC), Sheet mould compounds (SMC), Prepregs.	15	40
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	15	20	10	5	5

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(asper Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

Books:

1. FRP TECHNOLOGY by Weatherhead.
2. FIBER REINFORCED COMPOSITES- Materials, Manufacturing, and Design by P.K. Mallick
3. COMPOSITES MANUFACTURING- Materials, Product, and Process Engineering by Sanjay K.Mazumdar

4. Plastics technology handbook by Manas Chanda
5. Hand book of Reinforcement for plastics – Milewski
6. Sidney H. Goodman, Handbook of Thermoset Plastics, John Wiley & Sons, 1984.

(b)Open source software and website:

1) https://nptel.ac.in/

2) https://www.bpf.co.uk/plastipedia/

Suggested Course Practical List: : As per the above syllabus topics

* * * * * **