GUJARAT TECHNOLOGICAL UNIVERSITY

MANUFACTURING ENGINEERING (34)
COMPOSITE TECHNOLOGY
SUBJECT CODE: 2183409
B.E. 8TH SEMESTER

Type of course: Theoretical + Practical (Regular)

Prerequisite: To provide comprehensive knowledge about the Composite techniques.

Rationale: To understand the various techniques of composite.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightag
1	**Introduction** – Resins for composites – polyester resins – epoxy resin – phenolic resins – vinyl ester resins – alkyd resins.	06	12
2	**Reinforcements for composites:** Natural fibers – jute, sisal – synthetic fibers – glass fibers – types and different forms – carbon fibers – classification - graphite fibers – polyethylene fibers – silicon carbide and boron fibers.	10	24
3	**Additives for composites:** catalysts – room temperature and elevated temperature – accelerators – coupling agents – fillers – flame retardants – toughening agents – UV stabilizers.	08	20
4	**Processing of composites**: Important processes like hand lay-up, spray-up, resin transfer moulding, vacuum bag, pressure bag moulding, centrifugal casting, pultrusion, filament winding, moulding compounds – SMC, DMC, BMC, TMC.	08	20
	Testing Quality control & end use of plastics: Testing for mechanical, electrical, thermal, optical and chemical properties, Determination of shelf life and gel time – Non-destructive testing methods. Application of FRP products - in marine, chemical, railways, electrical and electronic industry, space structures – Robotics.	10	24
	Total	42	100%

Reference Books:

1. Fiber Reinforced composites, P.K. Mallic, Morcal Dekker Inc. 1988.
2. Handbook of Thermoset Plastics, Sidney H. Goodman, John Wiley & Sons, 1984.
3. Advanced Composites Manufacturing, T.G. Gutowski, John Wiley & Sons, 1997.
4. Reference Book for Composite Technology I, II & III, S.M. Lee, Technomic Publishing

Course Outcome:
At the end of this course the student should be able to understand about composite techniques.

- To understand the composite techniques.

- To learn the importance the composite techniques.

List of Tutorials:

Tutorials and Exercise is as per availability in the laboratory also Industry visit

Design based Problems (DP)/Open Ended Problem:

Problems and case study is as per syllabus, it is also required to have industry visit.

Major Equipment:

Composite Technology lab equipments

List of Open Source Software / Learning Website:

1. http://nptel.ac.in

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides/Canvases/Drawing sheets with different color pens for graphical representation of for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.