

# GUJARAT TECHNOLOGICAL UNIVERSITY

**B.E. Semester : 4**

## **Chemical Technology**

Subject Code : 143605

Subject Name : Composite Materials  
(Institute Elective – 1)

<b>Sr. No.</b>	<b>Course contents</b>
<b>01.</b>	Basics of polymer and polymerization process, Manufacturing of important polymers used in composites. (Polyethylene, Polypropylene, PVC, Nylon, PET, PEEK, Polysulfone, Polycarbonate, Phenolic resins, unsaturated and saturated polyesters, poly urethanes, elastomers and rubbers etc. The properties of these polymers.
<b>02.</b>	Major processes employed in manufacture of composites. (Extrusion, Pultrusion, Resin transfer Molding, laminates, etc.). Reinforcement and fillers used in composites.
<b>03.</b>	Testing and evaluation of composites. Stress-strain relations and engineering constants, Strength of an orthotropic lamina; Analysis of laminated composites: Strains and stresses in a laminate, Synthesis of stiffness matrix, Special laminates, Analysis of laminates after initial failure.
<b>04.</b>	Application of composites, Advanced composites using nano materials. Emerging areas in composites.

## Reference Books:

1. Plastics : Materials & Processing, A Brent Strong, Prentice Hall, 1996
2. Mechanics of Composite Materials, R. M. Jones, Taylor and Francis, Philadelphia, 2<sup>nd</sup> Ed., 1999.
3. Engineering Mechanics of Composite Materials, . M. Daniel and O. Ishai ,Oxford University Press, New York, 2<sup>nd</sup> Ed.2005.
4. Composites Engineering Handbook, P. K. Mallick Marcel Dekker, New York, 1997.
5. Mechanics of Fibrous Composites,. C. T. Herakovich,, Wiley, New York, 1998.
6. Stress Analysis of Fiber-Reinforced Composite Materials, M. W. Hyer, WCB/ McGraw-Hill, New York, 1998.
7. An Introduction to Composite Materials, D. Hull, Cambridge University Press, Cambridge, U.K., 1981.
8. Analysis and Performance of Fiber Composites, Agarwal B.D., Broutman, L.J., and Chandrashekharan, K., John Wiley & Sons, Inc.,3<sup>rd</sup> Ed., 2006.
9. Fillers and Filled Polymers, J F Gerard, Wiley-VCH, 2001
10. Composite Polymeric Material, R P Sheldon, Applied Science Publishers, 1982
11. Composites : Design Guide , Industrial Press Inc, 1987
12. Composite Material Handbook, M M Schwartz, Mc Graw Hill, 1984

**APPROPRIATE NUMBER OF PRACTICALS WILL BE CONDUCTED AS  
PER THE THEORY SYLLABUS**