

1.	Title of the course	Composite Materials
2.	Course number	ME507L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5023/5
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	Course Objective(s): The objective of the course is to provide an overview of composite materials and their application and introduce them to (1) Characterization and processing techniques of composite materials (2) Micromechanics of composite materials and (3) Test methods for characterizing their properties	
10.	Course Content: Introduction to types of composites: metal matrix, ceramic matrix, polymer matrix and carbon-carbon composites; Characteristics of polymer matrices, Method of preparation of fibres (glass and carbon), characteristics of different types of fibers; Processing of fibre reinforced polymer matrix composites. Micromechanics and prediction of elastic constants of continuous and short fiber composites; Strength of composites; Constitutive relations, failure modes and failure theories for an orthotropic lamina; Behavior of laminated composites, classical laminate theory (CLT); Analysis of Laminates for first ply failure, progressive failure and for hygrothermal loads using CLT. Interlaminar stresses and their significance, Test methods for characterization of composite elastic constants and strength; Strength of notched laminates.	
11.	Textbook(s): 1. Agarwal B D, and Broutman L J, <i>Analysis and performance of fiber composites</i> , 4th Edition, Wiley (2018).	
12.	Reference(s): 1. Daniel I M and Ishai O, <i>Engineering Mechanics of Composite Materials</i> , Oxford University Press (2005). 2. Autar K. Kaw, <i>Mechanics of Composite Materials</i> , CRC Press (2005).	