Course Number and Name
BME007 - COMPOSITE MATERIALS AND TECHNOLOGY
Credits and Contact Hours
3&45
Course Coordinator's Name
Mr.Sharavanan
Text Books and References

TEXTBOOKS:

1. Krishnan Chawla ,Composite Materials Science and Engineering, Springer publications,2012.

2. Daniel gay, Composite Materials, CRC Press, 3rd edition.

REFERENCES:

1. Ronald Gibson, Principles of Composite Material Mechanics, Tata McGraw Hill, 1994.

2. Michael Hyer, Stress Analysis of Fiber- reinforced composite Materials, Tata McGraw Hill, 1998.

3.http://www.springer.com/in/book/9780387743646

4.https://books.google.co.in/books/about/Composite_Materials.html?id=5Q6oUTFO0RgC

Course Description	
To understand the fundamentals of composite material strength and its mechanical behavior Understanding the analysis of fiber reinforced Laminate design for different combinations of plies with different orientations of the fiber.	
Prerequisites	Co-requisites
machine design, Industrial Metallurgy	Nil
required, elective, or selected elective (as per Table 5-1)	
Core Elective	
Course Outcomes (COs)	
CO1	Will understand basic introduction of composite material
CO2	Will understand the fundamentals of fibres and polymers
CO3	Understanding the manufacturing process .
CO4	Thermo-mechanical behavior and study of residual stresses in Laminates during processing. Implementation of Classical Laminate Theory (CLT)
CO5	Study about design of composites
CO6	Understand application of FEM

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H							M			L	
CO2	H						H	M			L	H
CO3			H	H	H		H				L	
CO4					M		H				L	H
CO5					M							H
CO6						M	H	M				H

List of Topics Covered

UNIT I INTRODUCTION **9**

Conventional materials–Limitations–Definition of composite materials–Difference between conventional and composite materials-Types of Characteristics (Dispersions, particulates, fibre)-Application.

UNIT II MATERIALS **9**

Fibres-Materials-fibre reinforced plastics-Thermoset polymers-Coupling agents, fillers and additives-Metal matrix and ceramic composites-Particulate reinforced composite

UNIT III MANUFACTURING **9**

Fundamentals-bag moulding-compression moulding- pultrusion-filament winding-other manufacturing process-MMC's Casting (Solid and liquids state processing)-quality inspection and non destructive testing

UNIT IV MECHANICS AND PERFORMANCE **9**

Introduction to micro-mechanics-Unidirectional laminates-interlinear stresses-static mechanical properties-fatigue properties-impact properties-environmental effects-fracture mechanics and toughening mechanisms, damage prediction, failure modes.

UNIT V DESIGN OF COMPOSITES **9**

Failure predictions-design considerations-joint design-codes-design examples. Optimization of laminated composites-Application of FEM for design and analysis of laminated composites.