	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Bachelor of Technology in Mechanical Engineering**			Year of Regulation			**2018**
Department	**Mechanical Engineering**			Semester			**VI**

Course Code	Course Name		Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
ME314	**Mechanics of Composite Material**		**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	To introduce the application and types of composite materials.	Course Outcomes	CO1	Able to understand the application and types of composite materials(Understanding)
	To develop the knowledge to apply generalized Hooke's law in composite material.		CO2	Able to use the knowledge of generalized Hooke's law in composite material (Applying)
	To develop the knowledge of classical laminated and first order theories.		CO3	Able to utilizethe knowledge of classical laminated theory (Applying)
			CO4	Able to build up the knowledge of the first order theories (Applying)
	To develop an ability to analyse bending of composite beams and plates.		CO5	Able to developthe skill for bending analysis of composite beams and plates (Analyzing)

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**
2	CO2	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**
3	CO3	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**
4	CO4	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**
5	CO5	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**
6	CO6	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

SYLLABUS			
No.	Content	Hours	COs
I	**Introduction** Fibers and matrix, laminae and laminates, types, rule of mixture, applications, brief on manufacturing of composites	**05**	**CO1**
II	**Basic of Composite Material** Anisotropy, orthotropic and transversely isotropic material, generalized Hooke's law, characteristics of a unidirectional Lamina, transformation of stresses and strains, plane stress constitutive relations	**12**	**CO2** **CO3**
III	**Classical Laminated Plate Theory** Classification of structural theories, assumptions, strain-displacement relation, lamina constitutive relations, equation of motion, laminate constitutive equations, symmetric laminates, antisymmetric laminates, balanced and quasi isotropic laminate	**08**	**CO1**
IV	**First-Order Theory of Composite Plates** Assumptions, strain-displacement relation, lamina constitutive relations, equation of motion, laminate constitutive equations, example with different types of laminates	**05**	**CO3** **CO4**
V	**Analysis of Laminated Composite Plates** Bending of laminated beams, governing equation, basics in bending of rectangular plates, Brief on failure criteria.	**06**	**CO2** **CO3** **CO4**
	Total Hours	**36**	

Essential Readings

1. J. N. Reddy, "Mechanics of Laminated composite plates and shells-Theory and analysis", Second Edition,CRC Press, 2004.

2. R. Jones, "Mechanics Of Composite Materials", Second Edition, CRC Press, 1998.

Supplementary Readings

1. S. W. Tsai, J.D. D. Melo, "Composite Materials Design and Testing: Unlocking Mystery with Invariants", Second Edition, JEC Group, 2015.