Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCED524	Mechanics of Composite Materials	3	0	0	3

Course Objective
The course aims at exploring the analysis of laminated composites structural elements.
Learning Outcomes
Development of computer programme for analyzing laminated composites structural elements

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Composite Fundamentals, Classification and characteristics of composite materials, Constituent Materials for Composites, Manufacturing Processes. Micromechanical analysis of composite strength and stiffness.	**8L**	Concept of composite materials and micromechanical modelling.
2	Elastic properties of unidirectional lamina, stress strain relationship, transformation of stress and strain, derivation of reduced stiffness matrix. Analysis of laminated composite, determination of lamina stresses and strains, coupling effects, All type of laminate configurations and its analysis. Computer program for finding stiffness matrix of multi layered laminate.	**12L**	Derivation of stiffness matrices. Analysis of laminated composites
3	Analysis of laminated plates: Classical laminate plate theory for bending of composite plate. Navier's method of solution for analysing composite plates. Shear deformation theory for laminated plate: First order, higher order theory. Free vibration and stability analysis of laminated plates. Development of matlab programme for analyzing laminated plates.	**14L**	Modelling of laminated composite plates under different conditions and solution methodologies
4	Failure theories and strength of a unidirectional lamina, Micromechanics of failure of unidirectional lamina. Anisotropic strength and failure theories: maximum stress theory, strain theory, Tsai-Hill criteria, Tsai-Wu criteria, Analysis of laminate strength.	**8L**	Failure analysis of composites under different loading conditions.
	Total Contact Hours	**42L**	

Text Books:

1. Jones, R. M. (2014). *Mechanics of composite materials*. CRC press.

Refference Books:

1. Mukhopadhyay, M. (2005). *Mechanics of composite materials and structures*. Universities press