

Analysis and Artificial Intelligence Assisted Design Optimization of Composite Structures

Course Coordinator

Dr. G. NARAYANA NAIK

Department of Aerospace Engineering, IISc

Course Schedule: Every Thursday's 7:30 P.M. to 10:00 P.M.

Mode: Online

**INDIAN INSTITUTE OF SCIENCE (IISc)
CENTRE FOR CONTINUING EDUCATION (CCE)
CCE-PROFICIENCY COURSE (MAY – JULY 2026)**

Course Fee	10000
Application Fee	300
GST@18%	1854
Total	12454



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Minimum Qualification

B.E / B.Tech. / AMIE / AMAeSI (Engg.) (Mechanical, Aero, Civil, Automobile, Marine, Ocean) OR equivalent.

Objectives of the Course

Composites are future materials and have been finding applications in all fields of Engineering (Aero, Civil, Mechanical, Automobile, Marine). Many FEM software packages are available for Analysis & Design Optimization. One should first understand the Mechanical behavior of the Composite Structures before using FEM packages. After the completion of this course one can use the FEM software packages for better quality of professional work and optimum usage of time, computing and human resources. The course also introduces Artificial Intelligence and machine learning concepts for design optimization of composite structures.

Syllabus

Introduction: Basic Concepts and Terminology, different types of fibers and matrices, their properties and applications. Micromechanics of Composites: Prediction of properties etc. Macromechanics of Lamina: The theory of elasticity, Constitutive equations of a lamina, transformations, Numerical examples. Failure theories for composite lamina, Numerical examples. Mechanics of Laminated Composites: ABD matrices, etc. Hygrothermal Analysis, Numerical examples. Bending Analysis of Beams: Theory, Numerical examples. Analysis of Laminated composite plates: Classical and first order theories, Energy Method, numerical examples. Buckling analysis of plates: Theory, Numerical examples. Design of laminates using Carpet plots, AML plots, Design of laminates with Numerical examples. Artificial Intelligence assisted Design Optimization of Composite Structures with Numerical examples and Comparison of Artificial Intelligence Methods.

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