



# ADVANCED COMPOSITES

**PROF. NACHIKETA TIWARI**

Department of Mechanical Engineering  
IIT Kanpur

**TYPE OF COURSE** : Rerun | Elective | UG/PG

**COURSE DURATION** : 12 Weeks (24 Jan' 22 - 15 Apr' 22)

**EXAM DATE** : 24 Apr 2022

**PRE-REQUISITES** : Must be enrolled into a B. Tech. program or equivalent and should have completed at least second year of his 4-year program.

**INTENDED AUDIENCE** : UGs, PGs, professionals in industry who want to learn about basics of sound and acoustics

**INDUSTRIES APPLICABLE TO** : Automotive, Composites, Aerospace, Sports, Railways, Power Generation and all industry that has to address issues related composites

**COURSE OUTLINE :**

This course is intended for all those who want to conduct experiments in area of NVH. Thus, the course is open to students of engineering and science, and also to all those who from the industry and research organizations – who are working in area of sound, NVH and acoustics. Each lecture will be followed by a quiz, which will help student the concepts better, and gain deeper insights to measurement process. The course is fairly generic so that there is no need for a particular background. Rather, what is needed is openness, and ability to learn and check out new ideas with comfort.

**ABOUT INSTRUCTOR :**

Prof. Nachiketa Tiwari is an Associate Professor of Mechanical Engineering at IIT Kanpur. He has extensive experience in area of composites, product design, acoustics and noise. Earlier, he worked for over 13 years at the R&D Headquarters Bose Corporation in Massachussetts. He has a PhD in engineering mechanics from Virginia Tech. His area of PhD research was related to nonlinear behavior of composite structures.

**COURSE PLAN :**

**Week 1:** Intro and engineering properties

**Week 2:** Unidirectional lamina & elasticity tensor

**Week 3:** A, B, D matrices

**Week 4:** Failure of lamina and laminates

**Week 5:** Differential equations

**Week 6:** Composite beams

**Week 7:** Composite plates

**Week 8:** Composite plates

**Week 9:** Short fiber composites

**Week 10:** Short fiber composites

**Week 11:** Short fiber composites

**Week 12:** Temperature and moisture effects