

National Institute of Technology Karnataka, Surathkal



Short Course Sponsored by GIAN
MHRD, GOI
On



Hybrid Composites: Manufacturing, Mechanics and Materials (151034L04) December 18-22, 2016

OVERVIEW

The overarching goal of this course is to disseminate cutting-edge technology and research in the field of advanced composites. Efforts are widely being pursued globally in developing advanced composites with the intension of superior performance compared to monolithic materials and alloys. In Indian scenario with concentrated focus on SKILL DEVELOPMENT and MAKE IN INDIA initiative of GOI, transportation sector will benefit from the expertise shared by the speaker on developing hybrid composites.

Module	
	Lecture 1 : 9.30 to 10.30 AM Introduction to Hybrid Composites: Manufacturing, Mechanics & Applications Lecture 2 : 10.45 to 12 Noon 18 th Dec. Micromechanical Modeling to Determine the Compressive Strength & Failure Mode Interaction of Multidirectional Laminates Tutorial 1 : 2 to 3 PM Interface Strengthening of Multi-directional Laminates using Additive Manufacturing
	Lecture 3 : 9.30 to 10.30 AM Fiber reinforced Composites: Micromechanics and Lamination Theory for understanding the mechanics of these materials 19 th Dec. Lecture 4 : 10.45 to 12 Noon Damage and Failure Theories for Composites Tutorial 2 : 2 to 3 PM Physical testing and data analysis for composites materials
	Lecture 5 : 9.30 to 10.30 AM Experimental Investigation of Thermal Shock Effects on Carbon-Carbon Composites 20 th Dec. Lecture 6 : 10.45 to 12 Noon Computational Modeling of Carbon/Carbon Composites under Thermal Shock Conditions Tutorial 3 : 2 to 3 PM Hybrid Textile Composites as Potential Cryogenic Tank Materials
	Lecture 7 : 9.30 to 10.30 AM Sandwich Composites for Marine Applications 21 th Dec. Lecture 8 : 10.45 to 12 Noon Influence of arctic sea water conditions on the failure mechanics of woven sandwich composites Tutorial 4 : 2 to 3 PM Foams Cores for Sandwich Composites: Novel Low Density Materials – Manufacturing Demonstration
	Lecture 9 : 9.30 to 10.30 AM Nanowire Reinforcement of Woven Composites for Enhancing Interlaminar Fracture Toughness 22 th Dec. Lecture 10 : 10.45 to 12 Noon Impact Response of Woven Composites with Interlaminar Reinforcement Tutorial 5 : 2 to 3 PM Quasi-2D Model for Free Edge Effects in Laminates under Multi-axial Loading

WHO CAN ATTEND?

- Executives, engineers and researchers from Manufacturing, Service and Government organizations including R&D laboratories and industry.
- Student at all levels (B.Tech/M.Sc/M.Tech/Ph.D) from all the streams or Faculty from reputed academic institutions and technical institutions.

COURSE FEES

Participant from abroad	: US \$500
Industry/research organizations	: Rs. 5000/-
Faculty from Academic Institutions	: Rs. 2000/-
Students	: Rs. 1000/-

The above fees include all instructional materials. Limited participants will be provided with sharing accommodation on payment basis.

NO registration fee for faculty/students of NITK, Surathkal.

TEACHING FACULTY



Dr. Pavana Prabhakar is an Assistant Professor of structural mechanics in the Department of Civil and Environmental engineering at the **University of Wisconsin-Madison** (mamel.engr.wisc.edu), where she leads the Manufacturing and Mechanics Lab (MaMeL). She earned her PhD in Aerospace Engineering from the University of Michigan, Ann Arbor in May 2013. She received a Master's degree in Civil and Environmental Engineering from the University of California, Berkeley in 2008 and her bachelor's degree from the National Institute of Technology, Karnataka, India in 2007.

Her current and previous research involves extensive work in the computational and experimental investigation of failure and damage in solids for structural applications. Her research efforts are focused towards designing materials with high strength and toughness to ensure the structural integrity of fabricated materials. Her expertise include micromechanical and structural analysis of materials using computational modeling, understanding the effect of extreme environment on the microstructure and mechanical properties, and failure analysis of structural materials using state-of-art technology. She has a vast experience in modeling the manufacturing processes for polymeric composites and metals accounting for defect formation during fabrication and their influence on the quality of the fabricated material. She is also one of the recipients of the 2015 Air Force of Office of Scientific Research Young Investigator Program (AFOSR-YIP) award, where her focus is on novel multiscale design of interfaces for polymeric composites and bonded joints using polymer additive manufacturing.

Course Coordinators



Dr. Mrityunjay Doddamani
Principal Co-ordinator
Department of Mechanical Engg.,
National Institute of Technology
Karnataka (NITK), Surathkal,
PO Srinivasnagar 575 025, Mangalore
Tel: +91 94489 20878 (M)
Email: mrdoddamani@nitk.edu.in



Prof. S. Narendranath
Co-principal Co-ordinator
Department of Mechanical Engg.,
National Institute of Technology
Karnataka (NITK), Surathkal
PO Srinivasnagar 575 025, Mangalore
Tel: +91 09448793833 (M)
Email: narenbayalu@gmail.com