



Government of India
Ministry of Human Resource
Development



Global Initiative on Academic Networks (GIAN) Program

FATIGUE OF COMPOSITE MATERIALS 11-15 November 2019

By
International Faculty

Dr Anastasios P Vassilopoulos

Senior Scientist Composites Construction Laboratory
École Polytechnique Fédérale de Lausanne (EPFL)
Switzerland

Course Coordinators

Dr Raman Bedi
Associate Professor, Department of Mechanical Engineering
&
Dr S P Singh
Professor, Department of Civil Engineering



DEPARTMENT OF MECHANICAL ENGINEERING
&
DEPARTMENT OF CIVIL ENGINEERING
Dr B R Ambedkar National Institute of Technology Jalandhar- 144011
Punjab, INDIA
Institute Website: www.nitj.ac.in

Overview of the Program

There has been an upsurge in the interest in composite materials in the last few decades, primarily due to high demand on material performance placed by advanced technologies. Conventional materials are unable to meet these demands. Improvements in mechanical properties, e.g. stiffness, strength and fracture toughness, are being increasingly made feasible by advancements in composite manufacturing technologies. Numerous applications of these materials can be found in the aerospace sector—significant parts of commercial and fighter airplanes are made of advanced composite materials; the automotive industry—racing car chassis, ceramic brakes, etc; the wind industry, where wind turbine rotors with diameters of more than 100 meters are now constructed using fibre-reinforced composite materials. The use of concrete composites in different civil engineering infrastructures such as bridge decks, harbours, docks, pre-stressed concrete pavements, dams, etc. has increased in the past few decades. Indeed, the applications for which composite materials are being found to be most advantageous are precisely those situations in which the degradation of strength and life by fatigue process is most likely. Fatigue damage in composite materials is a process of stochastic nature. Consequently, statistical and probabilistic concepts and methods are needed for an assessment of the safety and reliability of the composite structures under fatigue loading.

This course is intended for university students, faculty and researchers having interest in the fatigue of composite materials. It will provide information regarding the fatigue behaviour of the composite materials and lead them step by step through the available methods for the modelling of the fatigue life of these materials and the prediction of their lifetime.

Course Objectives

At the end of the course, students/researchers shall be able to:

1. Understand the basic mechanisms involved in the fatigue behaviour of composite materials.
2. Understand various methodologies for fatigue life modelling and fatigue life prediction of composite materials.
3. Use various statistical/probabilistic concepts for analysis of fatigue life data for composite materials.
4. Use various soft computing techniques for fatigue life modelling of composite materials.

Course Faculty



Dr Anastasios P Vassilopoulos

Senior Scientist

Composites Construction Laboratory

École Polytechnique Fédérale de Lausanne (EPFL)

Switzerland

Dr Anastasios P Vassilopoulos is a Senior Scientist in Composites Construction Laboratory at École Polytechnique Fédérale de Lausanne, (EPFL), Switzerland. Dr Vassilopoulos worked for his Master's Degree in the University of Bristol, UK and obtained PhD from the University of Patras, Greece where he also worked as a Post-Doctoral Research Associate. His areas of research include: Experimental methods for the study of the behavior of composite materials under static and fatigue loading, development of fatigue life prediction methodologies for composite materials and structures under variable amplitude complex stress states and design of constructions with composite materials.

Who Can Attend

This course on composite materials is an interdisciplinary one which will be beneficial to students/research scholars/faculty members/scientists and technologists of Mechanical Engineering and Civil Engineering departments. Persons from other departments having interest in this area, are also welcome. It will assist in disseminating the knowledge and know-how related to various aspects of composite materials with special reference to their fatigue behaviour. The following persons can attend this programme:

- Faculty/Scientists/Technologists from academic Institutions/research organisations.
- Research Students/Master's students from academic institutions.

Program Coordinators

Dr Raman Bedi

Associate Professor, Department of
Mechanical Engineering
Dr B R Ambedkar National Institute of
Technology
GT Road Bye pass, Jalandhar
Punjab 144 011, India
Tel: +91-9815981054
Email: bedir@nitj.ac.in,
bediraman74@gmail.com

Dr S P Singh

Professor, Department of Civil Engineering
Dr B R Ambedkar National Institute of
Technology
GT Road Bye pass, Jalandhar
Punjab 144 011, India
Tel: +91-9814088475
Email: spsingh@nitj.ac.in

Registration Fee

Participants from abroad: US \$200

Staff from Industry/Research Organizations: Rs. 10,000/-

Faculty/staff from Academic Institutions: Rs. 2,000/-

Students: Rs. 500/-

Registration fee covers only course material and refreshments. Boarding and lodging will be provided on payment basis subject to availability. Limited shared accommodation is available in Institute Guest House/Hostels on request against the advance payment on first-come first serve basis.

Registration fee is payable in the form of Demand Draft in favour of '**GIAN- Fatigue of Composite Materials**' payable at Jalandhar. Registration form along with requisite fees should be sent to **Dr Raman Bedi, Program Coordinator**.

How to Register

Step-1: One time Web (Portal) Registration: Visit GIAN Website at the link: <http://www.gian.iitkgp.ac.in/GREGN/index> and create login User ID and Password. Fill up the blank registration form and do web registration by paying ₹500 online through Net Banking/Debit/Credit card. This provides him/her with life time registration to enroll in any number of the GIAN courses offered.

Step-2: Course Registration (Through GIAN Portal): Log in to the GIAN portal with the user ID and Password created. Click on "Course Registration" option given at the top of the registration form. Select the Course titled 'Fatigue of Composite Materials' from the list and click on 'Save' option. Confirm your registration by Clicking on 'Confirm Course'.

About the Institute

Dr B R Ambedkar National Institute of Technology was established in the year 1987 as Regional Engineering College and was given the status of National Institute of Technology (Deemed University) by the Government of India on 17 October 2002 under the aegis of Ministry of Human Resource Development, New Delhi. The Ministry of Human Resource Development, Government of India has declared the Institute as 'Institute of National Importance' under the act of Parliament-2007. As one of the NITs, the Institute has the responsibility of providing high quality education in Engineering, Technology and Sciences to produce competent Technical and Scientific manpower. The Institute offers B Tech, M Tech, M Sc, MBA and Ph D programs in several disciplines of Engineering, Science & Technology, and Management.

About the Departments

The Department of Mechanical engineering was founded in 1990 and has grown as one of the dynamic departments of the Institute over the last two decades. The department offers B Tech, M Tech and PhD programs. The B Tech program is accredited by the NBA.

The Department of Civil Engineering also offers B Tech in the discipline of Civil Engineering ever since its inception in the year 1989. The same has been accredited by the NBA. The department has been offering M Tech Programme in Structural and Construction Engineering since 2004. The doctoral programmes in different specializations were started in the year 2006.

Both the Departments have also been selected as 'DST-FIST Sponsored Department' by the Ministry of Science and Technology, Government of India. The course curriculum has been designed catering to the existing and emerging needs of the industry. The Departments have established state-of-the art laboratories with sophisticated equipment for undergraduate courses and research work.

Patron

Professor Lalit Kumar Awasthi

Director

Dr B R Ambedkar National Institute of Technology Jalandhar – 144011 India

Heads of Departments

Dr Rajiv Kukreja

Head of Department
Department of Mechanical Engineering
Dr B R Ambedkar National Institute of
Technology
GT Road Bye pass, Jalandhar
Punjab 144 011, India

Dr Arvind Kumar Agnihotri

Head of Department
Department of Civil Engineering
Dr B R Ambedkar National Institute of
Technology
GT Road Bye pass, Jalandhar
Punjab 144 011, India

Local GIAN Coordinator

Dr S Bajpai

Associate Professor
Department of Chemical Engineering
Dr B R Ambedkar National Institute of Technology
Jalandhar – 144011 India



Ministry of Human Resource
Development
Government of India



Registration Form
Global Initiative on Academic Networks (GIAN)
Program
Fatigue of Composite Materials
November 11-15, 2019

Dr B R Ambedkar National Institute of Technology Jalandhar

Name	
Designation	
Department	
Organization	
Address for Correspondence	
Email ID	
Mobile Number	
Field of Specialization	
Experience (in years)	
Details of Fee Paid Cash/DD/NEFT	
Signature of the Applicant with date	

Recommendations of the Sponsoring Authority

The applicant is hereby sponsored for GIAN program on **Fatigue of Composite Materials** and will be permitted to attend, if selected.

Signature and Seal of the Sponsoring Authority	
---	--