About IIT Kharagpur

Kharagpur - a dusty town tucked away in the eastern corner of India, famous until 1950 as home to the longest railway platform in the world - became the nursery where the seed of the IIT system was planted in 1951. IIT Kharagpur started its journey in the old Hijli Detention Camp in Eastern India, where some of the country's great freedom fighters toiled and sacrificed their lives for India's independence. Spurred by the success of IIT Kharagpur, four younger IITs sprouted around the country in the two following decades, and from these five came thousands of IITians, the brand ambassadors of modern India. It was the success of this one institution at Kharagpur that wrote India's technological odyssey.

The Institute takes pride in its relentless effort to provide the best platform for both education as well as research in the areas of science and technology, infrastructure designs, entrepreneurship, law, management, and medical science and technology. IITKGP is not just the place to study technology, it is the place where students are taught to dream about the future of technology and beam across disciplines, making differences enough to change the world.

Program Features/ Structure

Classroom lectures –50%

Numerical / Problem solving, Case study and Activity – 25%

Hands-on work with MSc.NASTRAN / ANSYS software –25%

Program Schedule and Venue

One week, 21 – 27 September 2020 (9:00-17.30)

IIT Kharagpur – Department of Aerospace Engineering

Program Fee

AICTE-QIP Sponsored Participants - NIL, Other Faculty Members - INR 10,000/- (Ten Thousand)+**GST** @18% per participant, Students INR 5,000/- (Five Thousand)+**GST** @18% per participant, Industry INR15,000/- (Fifteen Thousand)+**GST** @18% per participant.

Who will be benefitted (Eligibility)

The students with basic knowledge in solid mechanics, strength of materials are eligible. The practitioner engineers, who are working in Aerospace, Civil, and Mechanical Engineering, will be benefitted.

Last day of Registration

11

September 2020

Accommodation

Accommodation will be provided to the AICTE-QIP sponsored participants at the Campus Guesthouse. For other participants, the same will be provided on chargeable basis as per rule.

How to Apply

Use the link: **https://erp.iitkgp.ac.in/CEP/courses.htm** to apply ONLINE.

→ → Profile Fillup → Choose a Program → Apply Now

Payment if applicable is to be done **ONLINE** after getting short listed for the program.

Contact Us

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AICTE QIP

QUALITY IMPROVEMENT PROGRAMME

Indian Institute of Technology Kharagpur

2020

STRUCTURAL DYNAMICS FOR ENGINEERS

1 Week
21 – 27 September 2020

Introduction / Overview

Structural dynamics, is a type of structural analysis which covers the behavior of a structure subjected to dynamic loading (external/internal). Dynamic loads include movement of people, wind, waves, traffic, earthquakes, blasts, turbulence, etc. Any structure can be subjected to dynamic loading. Dynamic analysis can be used to find dynamic displacements, time history, and modal analysis.

Program Objectives

Structural analysis is mainly concerned with finding out the behavior of a physical structure when subjected to external/internal force. This action can be in the form of load due to the weight of things such as people, furniture, wind, snow, etc. or some other kind of excitation such as an earthquake, shaking of the ground due to a blast nearby, wind turbulence, etc. In essence all these loads are dynamic, including the self-weight of the structure because at some point in time these loads were not there. The distinction is made between the dynamic and the static analysis on the basis of whether the applied action has enough acceleration in comparison to the structure's natural frequency. If a load is applied sufficiently slowly, the inertia forces (Newton's first law of motion) can be ignored and the analysis can be simplified as static analysis.

Dynamic analysis for simple structures can be carried out manually, but for complex structures finite element analysis can be used to calculate the mode shapes and frequencies, response of the structure under dynamic (transient) or random loading.

What you will learn

Program Content

1. Introduction
2. Dynamics of Single Degree of Freedom (SDOF) System
3. Hands on: writing computer program for solution of SDOF
4. Dynamics of Multi-Degree Degree of Freedom (MDOF) System
5. Hands on: writing computer program for solution of MDOF
6. Modal Super position method
7. Random Vibration Analysis
8. Application of Finite Element Method in Dynamic Analysis of Industrial Problems
9. Introduction Finite Element Software

Case Studies (a) Beam Problem, (b) Framed Structure, (c) Space Truss, (d) Space Frame, etc.

NB: A caution-money of Rs. 1000/- in the form of demand draft has to be sent by all the provisionally selected participants, which will be returned only when the participant joins the course.

About the Faculty

Dr. Dipak Kumar Maiti

Dr. Dipak Kumar Maiti, Professor and Former HOD, Department of Aerospace Engineering, did his B.E. (Civil) from former B.E.College, Calcutta University (Currently IIEST) and continued his M.Tech and PhD in Aerospace Engineering, IIT Kharagpur. He was employed as Junior Project officer after one and half years of his doctoral research work under ISRO sponsored project, 'Thermostructural Analysis of Heated Launch Vehicle Structures' during August 1994 to December 1996. He was also employed at IIT Bombay as Senior Research Engineer and worked during December 1996 to May 1998 after completing his doctor research work from IIT Kharagpur in ADA Sponsored Project, 'Aeroservoelastic Stability and Response Studies for LCA'. He subsequently moved to Aeronautical Development Agency, Bangalore as scientist and worked for over six and half years in various positions such as Scientist/Engineer 'C' and 'D'. He joined department of Aerospace Engineering, IIT Kharagpur as Assistant Professor on October 2004. He has been promoted to Associate Professor and Professor in the years 2007 and 2014 respectively. He is currently holding the professor post in the Department of Aerospace Engineering, IIT Kharagpur. He has published over 80 international journal papers, over 70 national and international conference papers, over 50 project reports, handled several research projects sponsored by ARDB, ADA, DST, ISRO, etc. of worth a few crores. So far 10 research students have obtained their PhD degree under his supervision. Currently 12 research students are pursuing their doctoral research work under his supervision. He has guided over 70 M.Tech students for their Master's Projects and over 50 B.Tech students for their B.Tech Projects.

Co-Coordinator

Dr. Damodar Maity

Dr. Damodar Maity, Professor, Department of Civil Engineering, IIT Kharagpur has about 20 years of teaching and research experience. He has taught several structural engineering courses including Structural Dynamics and Earthquake Engineering, Advance Structural Analysis, Finite Element Method to both UG and PG students. He has conducted nine short term courses to the College and University teachers and working professionals both from Government and Industry. Prof. Maity has developed two video courses on "Design of Steel Structures" using (i) Working Stress Method and (ii) Limit State Method and one web course on "Finite Element Analysis" under NPTEL, MHRD. He is author of a book titled, "Computer Analysis of Framed Structures" published by I.K. International Pvt. Ltd. He has guided several Ph. D. and M. Tech. thesis in the area of structural dynamics. His research area of interest includes seismic control of high-rise structures, structural health monitoring, Fluid-structure interaction etc. He has received two best paper awards from The Institution of Engineers (India)