Theme of the Course

In today's highly competitive machining industries, assessment of quality, cost, sustainability and productivity is made on the bases of surface integrity, tool wear, cutting power, chatter control, dimensional integrity and many other factors. The objective of maintenance department is to monitor the machining conditions and suggest some control measures to achieve the better quality and productive outcomes. However, experimental examinations sometimes involve time and cost factors. At present, modeling tools are dominating in several engineering sectors. Perhaps the machine dynamics is a coupled model of tool and workpiece, which is highly nonlinear and the overall process stability depends on several operating parameters and conditions. The cutting instability sometimes called chatter is very important objective to be controlled in achieving better quality products. During the modeling process, often second-order delay differential equations in the time domain are to be solved. Time domain, frequency domain and direct simulation techniques are available for solving the infinite dimensional delay differential equations. The so-called stability diagrams are to be generated for identifying the boundaries of stability which delineate the machining parameter space into stable and unstable cutting conditions. The stable cutting conditions, which can now be chosen systematically, guarantee smooth product, ergonomic work environment and prolonged life of cutting tools and machine tools. Machining of thin-walled workpiece is of vital importance today. Especially, the design of milling process with flexible workpiece has been a topic of interest in aircraft components and other parts. With moderate depths of cut and high speeds, often the instability can be avoided.

Objectives

I. Exposing participants to the fundamentals of tool dynamics.
II. Building confidence amongst the participants in the application of stability assessment procedures.
III. Providing exposure to the practical problems and their solutions, through case studies and live pro-jects in machine tool dynamics.
IV. Enhancing the capability of the participants to identify and control the chatter instability in machining operations with the aim of optimizing productivity.
V. Utilize the various software tool in stability assessment.

शिक्षा मंत्रालय
MINISTRY OF
EDUCATION
सत्यमेव जयते

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

NIT ROURKELA DIAMOND JUBILEE 1961-2021

GLOBAL INITIATIVE OF ACADEMIC NETWORKS (GIAN)

GIAN-sponsored 5-Day Course

on

Machining instabilities and Preventive approaches for modern production industries

(26th-30th September 2022)

Organized by:
Department of Mechanical Engineering
NIT, Rourkela-769008
Website: www.nitrkl.ac.in

About the Institute

National Institute of Technology Rourkela is an Institute of national importance created under the act of parliament. NIT Rourkela has been ranked as 225 and 31th position in QS Asia University and QS Indian University Ranking 2021, respectively. It has also been ranked in 121st position in QS BRICS category, 2020. Times Higher Education has figured NIT Rourkela in the group of 801-1000 in World University Ranking 2022. The institute provides quality education in a diverse and multicultural environment. The mission of the institute is to become an internationally acclaimed institution of higher learning that will serve as a source of knowledge and expertise for the society and be a preferred destination for undergraduate and post graduate studies. The institute is offering undergraduate, post graduate and PhD programs in 21 branches of Engineering. The departments are engaged in consultancy and research activities of several government bodies such as DST, DAE, CSIR, DRDO, BARC, ISRO and private industries. The campus has green and beautiful gardens.

About the Department

The Mechanical Engineering Department is well known for teaching and research activities. The main research works are on the Industrial vibrations and condition monitoring, robotics, CAD/CAM, precision engineering, Metal forming, manufacturing, CFD, Industrial refrigeration and Cryogenics. Both core and interdisciplinary topics are included in curriculum. The department at present has over two hundred research scholars pursuing projects in diverse fields. There are four PG specializations including design, thermal, production and industrial cryogenics. The department has well equipped laboratories for both PG classes and research works along with some centers of excellence. Department has at present 31 faculty members and around 100 PG students in all four specializations. The department organizes several short term courses, conferences as well as student level programs through-out the year. It has dedicated computer center with licensed software and a workshop for fabrication works.

ORGANIZING COMMITTEE

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External Expert

Dr. Chigbogu G. Ozoegwu is a Senior Lecturer in the Departments of Mechanical Engineering and Mechatronic Engineering of the University of Nigeria, Nsukka, Enugu State, Nigeria. He is an Experienced Humboldt Fellow at the ITM, University of Stuttgart, Germany. His current research interests cut across manufacturing process mechanics and automation with many publications in high-impact journals.

Topics to be covered

- A Survey Theoretical and Applied Delay Differential Equations.
- Delay Differential Equations Modelling Metal-Cutting Chatter in Turning and Milling Operations.
- Problem-Solving Session with Examples: Time Domain Simulation of Single and Multi-Degree of Freedom Metal-Cutting Chatter.
- Instabilities in Mechanical Engineering problems
- Chatter prevention approaches
- Artificial Intelligence tools for identification, classification and control of machining chatter
- Optimization methods to improve the productivity.

How to Apply

Follow the below steps for the registration:
Step1: GIAN Web(Portal)Registration
GIAN website:
(http://www.gian.iitkgp.ac.in/GREGN/index) and create login user ID and Password.
Fill up the registration form and do web registration. First time users need to register and pay a one-time fee of INR500/-.

Step2: Course Registration (Through GIAN Portal)
Click on "Course Registration" option given at the top of the registration form. Select the Course titled "Machining instabilities and Preventive approaches for modern production industries" from the list and click on "Save" option. Confirm your registration by Clicking on "Confirm Course". Once you enroll for the course, an Enrolment/Application number will be generated and the course coordinator will be notified.

Step3: Send the course application to coordinator's e-mail address.

Who should attend

Industrial scientists from manufacturing, service and government organizations, including R&D laboratories as well as students or Faculty from academic institutions and technical institutions, who want to improve/understand practical issues and correlate with theoretical concepts.

Address for Correspondence

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