



MHRD Scheme on Global Initiative on Academic Network (GIAN)

Hybrid Micro and Nano Machining Processes

January 02 -06, 2023

Department of Mechanical Engineering

Indian Institute of Technology (ISM), Dhanbad, India



Overview

The trend in miniaturization of products is pervasive in areas such as information technology, biotechnology, environmental technology and medical industries. Advanced micromachining is the key supporting technology that has to be developed to meet the challenges posed by the requirements of product miniaturization. However, in many of the cases, a single micromachining process cannot fulfill all the requirements, due to the limitation of that process. In recent years, compound and hybrid micromachining is becoming the most promising technology for the production of miniaturized parts and components. This technology is becoming increasingly more important and popular because of a growing demand for industrial products, with an increased number not only of functions but also of reduced dimensions, higher dimensional accuracy and better surface finish. Compound and hybrid machining is the combination of processes and/or machines to produce parts in a more efficient and productive way.

The objective of this workshop is to disseminate knowledge of the recent development in Hybrid Micro and Nano Machining Processes and its application in industry. In this lecture series, some of the compound and hybrid micro-machining processes will be discussed with working principle, process capabilities, applications, advantages, limitations, current research trends, and future scopes for research of each process. Further, we will give a hands on training on hybrid machining processes.

Modules	Course code: 191058L01 All lectures and tutorials will be held offline (Physical mode)
You Should Attend If...	<ul style="list-style-type: none"> Students at all levels (B. Tech. / M. Tech. / Ph.D.) and faculty from academic institutions Executives, engineers and scientist and working professionals from Industries and R & D Laboratories
Fees	<p>The participation fees for taking the course are as follows:</p> <p>Participants from abroad : US \$100</p> <p>Industry Organizations: Rs.5000</p> <p>Faculty from Academic Institutions / Research organization: Rs.2000</p> <p>Students: Rs.1000</p> <p>The above fee is towards participation in the course, course materials, breakfast, lunch and dinner. One local tour may be conducted depending on the availability of fund received from the participants. The accommodation will be provided on a payment basis (depending on the availability).</p>



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The Faculty



Prof. Muhammad Pervej Jahan is currently working as an Associate Professor in the Department of Mechanical and Manufacturing Engineering at Miami University, Oxford, OH, USA. Prof. Jahan, a PhD from National University of Singapore, Singapore, is working on the areas of Micro and Nano-machining process. Prof. Jahan worked as a postdoctoral researcher in the department of Mechanical

Engineering at the University of Arkansas, Fayetteville, USA from August, 2010 – August, 2012. He was an Assistant Professor at Western Kentucky University, USA from August, 2012 to June, 2016. The main focus of his research is on multi-scale conventional and non-conventional manufacturing processes of engineering materials. The targeted applications of his research are in the areas of automotive, aerospace and biomedical industries. Prof. Jahan is an internationally reputed researcher. He has received several research grants and awards, some of them are from NASA and NSF. Currently, he is the graduate program director of the Mechanical Engineering Department at Miami University, Oxford, USA. Prof. Jahan has published over 115 articles in referred journals and conferences, 2 edited books and 20 book chapters. He received more than 10 US research grants. He received four best research paper awards. He also received “University Assessment Award”, 2021 for a significant contribution to the assessment of Mechanical Engineering Graduate Program at Miami University. He was an editorial board member of (1) International Journal of Materials Forming and Machining Processes (IJMFMP) and (2) Journal of Institute of Industrial Applications Engineers, Japan. He is a professional member of SME, ASME and ASEE.



Prof. Ashis Mallick is currently working as an Associate Professor, Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad. Dr. Mallick, a Ph.D. and postdoc from National University of Singapore, is working in the areas of mechanics of materials. His research includes synthesis and characterization of novel nanostructured and nanocomposite materials, phase field simulation

for microstructural evolution and thermal stresses. He worked as Visiting Scientist at the Unit of Materials and Transformation (UMET), University of Lille, France. His name also appeared in the list of inventory for Canadian Govt. Laboratory. He has published over 90 articles in refereed journals and conferences. He is a life member of ISTE and fellow of Institution of Engineers (India).

Registration:

Visit: <http://www.gian.iitkgp.ac.in/GREGN>

- Register by paying Rs 500/- (those who have already been registered, need not pay again)
- Opt the course (Course ID: **191058L01**) registration tab and save.
- After opting the course, you must pay the course fee by NEFT on or before 15.12.2022 in the following account number:

Account No. 0986101009746;
IFSC Code: CNRB0000986;
Bank: CANARA BANK;
Branch : Saraidhela, Dhanbad

Kindly inform to the course coordinator by e-mail along with the receipt of the payment of course fee.

Spot registration and payment may be allowed for the participants from abroad.

The maximum number of national participants is limited to seventy based on first come first served basis.

Course Co-ordinator

Prof. Ashis Mallick

Phone: +91 9471192246

E-mail: mallick@iitism.ac.in

Schedule (Indian standard time)

Inaugural Section 10.00-11.00 (02.01.2023)			Valedictory Programme 11.30 – 12.30 (06.01.2023)		
Day 1 02.01.23	Lecture-1 : MJ 11.30AM – 12.30 PM	Introduction of machining and micro-machining process	Day 3 04.01.23	Lecture-6 : MJ 9.00AM – 11.00 AM	Non-conventional micromachining processes
	Lecture-2 : AM 2.00 PM – 3.00 PM	Synthesis and performance of novel nanocomposites materials		Practical : AM / AD / MA 11.00AM – 1.00 PM	Visit of Machining laboratory and practical demonstration
	Practical : AM 3.00 PM – 5.00 PM	Visit and demonstration of Material synthesis laboratory	Day 4 05.01.23	Lecture-7: MJ 9.00AM – 11.00 AM	Assisted hybrid micromachining processes
Day 2 03.01.23	Lecture-3 : MJ 9.00AM – 10.00 AM	Hybrid mechanical micromachining processes	Tutorial : MJ 11.00AM – 1.00 PM	Problem solving session	Day 5 06.01.23
	Lecture-4 : AM 10.00AM – 11.00 AM	Microstructural study of the novel materials	Lecture-8: MJ 9.00AM – 11.00 AM	Current research trend and future research scope	
	Lecture-5 : MJ 11.00AM – 1.00 PM	Introduction to Micro-EDM combined with mechanical micromachining processes			

Instructors : Prof. Muhammad Pervej Jahan (MJ); Prof. Ashis Mallick (AM); Prof. Alok Das (AD) and Prof. Amitava Mandal (MA)