

Multi-scale and Hybrid Manufacturing Processes and Machines - *Modeling and Control* -

Overview

In the context of this course, multi-scale and hybrid manufacturing will be viewed as the ability to produce products or impart precise features on components that span the nano- to macro-scales by the use of a single or the simultaneous use of multiple energy sources for process execution. The need for such capabilities in many fields is driven, in large, by the emerging miniaturization technologies and by the complex functional integration in products in industrial sectors that include optics, electronics, defense, medicine, bio-technology, communications, space exploration, avionics, and others.

To meet the ever-increasing stringent requirements on scale, precision and function, new paradigms for manufacturing must emerge, rooted in the very technologies that they address, that are epitomized by the development of new processes and manufacturing machines. To address the imposed challenges, this course will focus on a key set of fundamental scientific and pragmatic technological topics associated with multi-scale and hybrid manufacturing processes and machines. As a vehicle to demonstrate process and machine modeling fundamentals and applications, multi-scale and hybrid process examples, i.e., material removal, forming, laser processing and additive manufacturing will be used. As a cross cutting issue, process and machine dynamics and stability will also be discussed along with generic methodologies and technologies associated with process and machine monitoring, compensation and control.

Course participants will learn these topics through lectures, case studies and assignments.

Course	November 6 – November 15 2020 Number of participants for the course will be limited to 50.
You Should Attend If...	<ul style="list-style-type: none">▪ you are a practicing engineer interested to learn about emerging processing and machine technologies.▪ you are a manufacturing or design engineer or research scientist interested in developing and implementing novel manufacturing processes and advanced processing machines.▪ you are a student or faculty from an academic institution interested to learn how to do state-of-the-art research on topics in advanced manufacturing science and engineering.
Fees	The participation fees for taking the course is as follows: Participants from abroad: US \$500 Industry/ Research Organizations: Rs.10,000 Academic Institutions: Rs.5,000 The above fee includes all instructional materials, computer use for tutorials and assignments, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty



Dr. Kornel Ehmann is a Professor of the Department of Mechanical Engineering at Northwestern University, Evanston, IL, USA. His main research interests are in the interrelated areas of machine tool structural dynamics, metal cutting processes and dynamics, computer control of machine tools and robots, accuracy control in machining, and micro/meso-scale manufacturing.

Course Co-ordinator



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