



NP-TEL

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Mechanical Engineering

Coordinators:

Prof. Manas Das

Department of Mechanical Engineering IIT Guwahati

NOC:Advanced Machining Processes - Video course

COURSE OUTLINE

There is a need for machine tools and processes which can accurately and easily machine the most difficult-to-machine materials and workpieces with intricate and accurate shapes. In order to meet these challenges, a number of newer material removal processes have now been developed to the level of commercial utilization. These newer methods are also called unconventional in the sense that conventional tools are not employed for metal cutting. Instead, energy in its direct form is used to remove the material from the workpiece. This course aims at bringing the students up-to-date with the latest technological developments and research trends in the field of unconventional / nontraditional / modern machining processes.

COURSE DETAIL

Week	Topics
1.	Introduction to advanced machining processes and their classification Ultrasonic machining and its modelling and analysis
2.	Abrasive jet machining (AJM) Water jet cutting (WJC) and Abrasive water jet machining (AWJM) Magnetic abrasive finishing (MAF) and its modelling
3.	Abrasive flow finishing (AFF) and its modelling Magnetorheological finishing (MRF)

4.	Magnetorheological abrasive flow finishing (MRAFF) and its modelling and analysis
5.	Electric discharge machining (EDM): Principle, applications, process parameters, and modelling. Electric Discharge Grinding (EDG), Electric Discharge Diamond Grinding (EDDG), and Wire Electric Discharge Machining (W-EDM)
6.	Laser beam machining (LBM) Plasma arc machining (PAM) Electron Beam Machining (EBM)
7.	Electro chemical machining (ECM): Principle, applications, and process parameters and modelling
8.	Electrochemical Grinding (ECG), Electrostream Drilling (ESD), Shaped Tube Electrolytic Machining (STEM) Chemical machining (ChM)

References:

1. V. K. Jain, Advanced Machining Processes, Allied Publishers, 2009.
2. Gary F. Benedict, Nontraditional Manufacturing Processes, Taylor & Francis, 1987.
3. J. A. McGeough, Advanced Methods of Machining, Springer, 1988.
4. Hassan El-Hofy, Advanced Machining Processes: Nontraditional and Hybrid Machining Processes, McGraw-Hill Prof Med/Tech, 2005.
5. V. K. Jain, Introduction to Micromachining, Alpha Science International Limited, 2010