

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Mechanical Engineering, VII-Semester

Departmental Elective ME- 702(A) Advance Machining Processes

Course Objectives:

- Understand the fundamentals and technologies used in different advance machining processes.
- Apply the characteristics and applications of the product obtained using advanced manufacturing processes.
- Compare different advance machining processes.

Syllabus:

Unit 1: Mechanical processes; Process selection, mechanics of cutting, metal removal rate, cutting tool system design, ultrasonic machining, abrasive jet machining, water jet machining, , effect of parameters and variables, applications and limitations, recent developments in mechanical processes.

Unit 2: Electrochemical and chemical metal removal processes; Electrochemical machining[ECM], elements of ECM, power source and control system, electrolytes, tool work system, chemistry of the process, tool design and metal removal rate, process faults, material removal and surface finish, electrochemical grinding, electrochemical deburring, electrochemical honing, chemical machining,

Unit 3: Thermal metal removal processes; Electric discharge machining[EDM], spark erosion, mechanism of metal removal, spark erosion generator, electrode feed control, vibrating electrode system, dielectric fluid, flushing, accuracy, plasma arc machining[PAM], non thermal generation of plasma, mechanisms and parameters, equipments, electron beam machining[EBM], generation and control of electron beam, theory and process capabilities, neutral particle etching, laser beam machining, hot machining, methods of local heating, tool life and production rate.

Unit 4: Rapid prototyping fabrication methods; Fundamentals, technologies, applications, principles and working of 3D printing, subtractive v/s additive manufacturing process, VAT photo polymerization, material and binder jetting, continuous liquid inter phase production, direct metal laser sintering.

Unit 5: Technologies of micro fabrication; Types of micro system devices, industrial applications, micro fabrication processes, LIGA process .Technologies of nano fabrication, importance of size, scanning probe microscope, carbon Buckyballs and nano tubes, nano fabrication processes,

References:

1. Mikell P. Groover, Fundamentals of Modern Manufacturing, Wiley India, ISBN 978 81 265 2301 6
2. Pandey P.C, Shan H.S., Modern Machining Processes, Tata McGraw Hill, ISBN 0 07 096518 8
3. Lal G.K, Gupta V, Reddy N.V., Narosa Publishing House, ISBN 81 7319 709 1
4. CMTI Handbook
5. Jain V.K. Introduction to Micro Machining Process Narosa Publication
6. Jain V.K. ,Micromanufacturing Processes , Crc Press.

Evaluation

Evaluation will be continuous an integral part of the class as well through external assessment.