ADVANCED MANUFACTURING PROCESS

Course Code: 13ME1149

Pre requisites: Manufacturing Technology.

Course Educational Objectives:

To make the student

✦ Acquire knowledge about nontraditional machining process
✦ Understand theory involved material removal mechanism
✦ Study the different process parameters
✦ Know the material addition processes

Course Outcomes:

The student will be able to

✦ Differentiate between various nontraditional machining process
✦ Identify suitable nontraditional machining process
✦ Be familiar with various material removal mechanisms
✦ Explain the phenomena of material addition processes

UNIT-I (12 Lectures)

MATERIAL REMOVAL PROCESSES:

Introduction, history of machining, traditional machining processes, nontraditional machining processes, hybrid machining processes. need for non-traditional machining processes.

MECHANICAL PROCESSES:

Ultrasonic machining - Introduction, the machining system, material removal process, factors affecting material removal rate, dimensional accuracy and surface quality, applications.

Water jet machining - Introduction, The machining system, Process parameters, Applications, Advantages and disadvantages of WJM.
Abrasive jet machining - Introduction, Machining system, Material removal rate, Applications, Advantages and limitations of AJM.

UNIT-II  
(12 Lectures)
CHEMICAL PROCESSES:
Chemical Milling - Introduction, Tooling for CHM, Process parameters, Material removal rate, Accuracy and surface finish, Advantages, Limitations, Applications
Photochemical Milling - Introduction, Process description, Applications, Advantages

ELECTROCHEMICAL PROCESSES:
Electro Chemical Milling: Introduction, Principles of electrolysis, Theory of ECM, ECM equipment, Basic working principles, Process characteristics, Process control, Applications

UNIT-III  
(08 Lectures)
HYBRID ELECTROCHEMICAL PROCESSES:
Electro Chemical Grinding - Introduction, Material removal rate, Accuracy and surface quality, Applications, Advantages and disadvantages
Electrochemical Honing - Introduction, Process characteristics, Applications
Electrochemical Super Finishing - Introduction, Material removal process, Process accuracy
Electrochemical Buffing - Introduction, Material removal process

UNIT-IV  
(14 Lectures)
THERMAL PROCESSES:
mechanism, applications, advantages and limitations. Electron beam machining - introduction, basic equipment and removal mechanism, applications, advantages and disadvantages. Plasma beam machining - introduction, machining systems, material removal rate, accuracy and surface quality, applications, advantages and disadvantages. Ion beam machining - introduction, material removal rate, accuracy and surface effects, applications.

UNIT-V  
(14 Lectures)

MATERIAL ADDITION PROCESSES: INTRODUCTION, CLASSIFICATION:


TEXT BOOKS:


REFERENCES: