

IV Year II Semester

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17ME831

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UNCONVENTIONAL MACHINING PROCESSES
(Professional Elective-IV)

Course Objectives:

- The course aims in identifying the classification of unconventional machining processes.
- To understand the principle, mechanism of metal removal of various unconventional machining processes.
- To study the various process parameters and their effect on the component machined on various unconventional machining processes.
- To understand the applications of different processes.

UNIT – I

INTRODUCTION: Need for non-traditional machining methods-classification of modern machining processes – considerations in process selection, applications.

Ultrasonic machining – Elements of the process, mechanics of material removal, MRR process parameters, economic considerations, applications and limitations.

UNIT – II

ELECTRO – CHEMICAL MACHINING: Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, Surface finish and accuracy, economic aspects of ECM – Simple problems for estimation of metal removal rate, fundamentals of chemical, machining, advantages and applications.

UNIT – III

THERMAL METAL REMOVAL PROCESSES: General principle and applications of Electric Discharge Machining, Electric Discharge Grinding and wire EDM – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, surface finish and machining accuracy, characteristics of spark eroded surface.

UNIT – VI

Electron Beam Machining, Laser Beam Machining - Basic principle and theory, mechanics of material removal, process parameters, efficiency & accuracy, applications.

UNIT-V

Plasma Machining: Application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries.

UNIT – VI

Abrasive jet machining, Water jet machining and abrasive water jet machining: Basic principles, equipment process variables, mechanics of material removal, MRR, application and limitations, magnetic abrasive finishing, abrasive flow finishing, Electrostream drilling, shaped tube electrolytic machining.

Text Books:

1. Fundamentals of Machining Processes-Conventional and non – conventional processes/Hassan Abdel – Gawad El-Hafy/CRC Press-2016.

References:

1. Modern Machining Process / Pandey P.C. and Shah H.S./ TMH.
2. New Technology / Bhattacharya A/ the Institution of Engineers, India 1984.
3. Non-Traditional Manufacturing Processes / Benedict /

Course outcomes:

After completion of course, the student shall understand the principle of working, mechanism of metal removal in the various unconventional machining process. The student is able to identify the process parameters, their effect and applications of different processes.