

## III B.Tech II Semester

**15AME41 - MODERN MANUFACTURING METHODS  
(MOOC)**

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**Course Objective:**

- To make the students to understand the advanced manufacturing techniques evolved in manufacturing scenario.
- To learn about the advanced manufacturing techniques USM, AJM, ECM, CM, EDM, PM, EBM, LSB,

**UNIT I**

**NEED FOR MODERN MANUFACTURING METHODS:** Non-traditional machining methods and rapid prototyping methods - their relevance for precision and lean manufacturing. Classification of non-traditional processes - their selection for processing of different materials and the range of applications. Introduction to rapid prototyping - Classification of rapid prototyping methods - sterolithography, fused deposition methods - materials, principle of prototyping and various applications.

**Learning outcome & Suggested Student Activities:**

After completion of this unit students are able to understand importance of non-traditional machining processes, features, classifications and applications of non-traditional methods.

**UNIT II**

Ultrasonic machining - Elements of the process, mechanics of material removal, process parameters, applications and limitations. Abrasive jet, Water jet and abrasive water jet machining: Basic mechanics of material removal, descriptive of equipment, process variables, applications and limitations.

**Learning outcome & Suggested Student Activities:**

After completion of this unit students are able to understand the processes of USM and AJM, process parameters, application and limitations.

**UNIT III**

**ELECTRO - CHEMICAL PROCESSES:** Fundamentals of electro chemical machining, electrochemical grinding, metal removal rate in ECM, Tooling, process variables, applications, economic aspects of ECM.

**CHEMICAL MACHINING:** Fundamentals of chemical machining- Principle of material removal- maskants - etchants- process variables, advantages and applications.

**Learning outcome & Suggested Student Activities:**

After completion of this unit students are able to understand the Electro-chemical process and applicable in manufacturing environment in terms of accuracy, surface finish and MRR and their relative advantages and disadvantages. He has to understand the chemical machining advantages and applications.

**UNIT IV**

**THERMAL METAL REMOVAL PROCESSES:** Basic principle of spark erosion (EDM), Wire cut EDM, and Electric Discharge Grinding processes - Mechanics of machining, process parameters, selection of tool electrode and dielectric fluids, choice of parameters for improved

  
**Head**  
**Mechanical Engineering Department,**  
**JNTUA College of Engineering,**  
**PULIVENDULA - 516 390.**

surface finish and machining accuracy - Applications of different processes and their limitations.

**PLASMA MACHINING:** Principle of material removal, description of process and equipment, process variables, scope of applications and the process limitations.

**Learning outcome & Suggested Student Activities:**

After completion of this unit students are able to understand the types of thermal based metal removal processes, principle of working, accuracy in machining, surface finish, tool selection and other machining parameters.

**UNIT V**

**ELECTRON BEAM MACHINING:** Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes - process mechanics, parameters, applications and limitations.

**LASER BEAM MACHINING:** Process description, Mechanism of material removal, process parameters, capabilities and limitations, features of machining, applications and limitations.

**Learning outcome & Suggested Student Activities:**

After completion of this unit students are able to understand and its the applications of electron beam and laser beam in manufacturing environment, accuracy, machining speed and etc, with respect to all non-traditional machining processes.

**TEXT BOOKS:**

1. Advanced machining processes, VK Jain, Allied publishers.
2. Modern Machining Process , Pandey P.C. and Shah H.S., TMH

**REFERENCE BOOKS:**

1. New Technology , Bhattacharya A, The Institution of Engineers, India 1984
2. Manufacturing Technology, Kalpakzian, Pearson
3. Manufacturing processes for engineering materials by Serope Kalpakjian and Steven R Schmid.

**SUGGESTED LINKS:**

- <http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv234-Page1.htm>.
- <http://www.learnerstv.com/Free-Engineering-Video-lectures-ltv530-Page1.htm>

Head  
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JNTUA College of Engineering,  
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