

**Course: CAM & INDUSTRIAL AUTOMATION (MEC405)**  
**(Spring 2020)**

**UNIT 1**

Introduction to NC and CNC machines, Open loop & closed loop CNC machines, classification of CNC machines, Advantages and Applications of CNC machines, Introduction to CNC programming, Adaptive control, Introduction to robotics, Elements of Robotic Systems, Material Handling Equipments, Automated Guided vehicles (AGV's), Introduction to Flexible manufacturing systems (FMS), Elements of FMS and its advantages, Cellular manufacturing.

**UNIT II**

Non-conventional machining processes: Introduction, Abrasive Jet Machining (AJM), Abrasive water jet machining (AWJM), Ultrasonic machining (USM), process variables and advantages, Electro Discharge Machining (EDM), process variables, advantages and applications. process variables.

Metrology: Limits, fits and tolerances: hole basis and shaft basis system, unilateral and bilateral system, Taylor's principles of gauge design, Sine bars and gauge blocks manufacturing method and their applications.

**UNIT III**

Introduction to industrial automation, and justification, pneumatics and electro-pneumatics, different valves, design of different pneumatic circuits for various industrial automation related applications.

**Reference books:**

1. *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems* by Mikell P. Groover, 5<sup>th</sup> Edition, Wiley Publication.
2. *Manufacturing Science* by A. Ghosh and A.K. Mallik, 2<sup>nd</sup> Edition, East-West Press, New-Delhi.
3. *Engineering Metrology and Measurements* by N.V. Raghavendra and L. Krishnamurthy, 1<sup>st</sup> Edition, Oxford University Press.
4. *Mechatronics* by W. Bolton, 3<sup>rd</sup> Edition, Pearson Publication.