CNC TECHNOLOGY
(Professional Elective – III)

B.Tech. IV Year I Sem.   **L   T/P/D C**
Course Code: **NT724PE/ME734PE**   **3   0/0/0 3**

Course objectives: Importance of CNC machines. Understand the fundamentals of it. Learning various methods of tooling the CNC machines. Various controlling methods, Learning the part programming

Course outcomes: At the end course, one should be able to select tooling method, control mechanism and do part programming for a given product.

UNIT - I

Features of NC machines: fundamentals of numerical control, advantage of NC systems, classification of NC systems, point to point, NC and CNC, incremental and absolute, open and closed loop systems, features of NC Machine tools, design consideration of NC machine tool, methods of improving machine accuracy.
CNC Machine elements: machine structures - Guide ways - feed drives-spindles- spindle bearings-measuring systems- tool mentoring systems.

UNIT - II

Tooling for CNC machines: interchangeable tooling system, preset and qualified tools, coolant fed tooling system, modular fixturing, and quick change tooling system, automatic head changers.
NC part programming: manual programming-Basic concepts, point to point contour programming, canned cycles, parametric programming.

UNIT - III

Computer-Aided Programming: General information, APT programming, Examples Apt programming problems (2D machining only). NC programming on CAD/CAM systems, the design and implementation of post processors. Introduction to CAD/CAM software, Automatic Tool Path generation.

UNIT - IV

DNC Systems and Adaptive Control: Introduction, type of DNC systems, advantages and disadvantages of DNC, adaptive control with optimization, adaptive control with constraints, Adaptive control of machining processes like turning, grinding.

UNIT - V

Micro Controllers: Introduction, Hardware components, I/O pins, ports, external memory, counters, timers and serial data I/O interrupts selection of Micro Controllers, Embedded Controllers, Applications and Programming of Micro Controllers.

Programming Logic Controllers (PLC'S): Introduction, Hardware components of PLC, system, basic structure, principle of operations, Programming mnemonics timers, Internal relays and counters, Applications of PLC'S in CNC Machines.

TEXT BOOKS:
1. Computer Control of Manufacturing Systems/ Yoram Koren/ Mc Graw Hill
2. CNC Programming: Principles and Applications /Mattson/ Cengage

REFERENCE BOOKS:
1. Machining Tools Hand Book Vol 3/ Manfred Weck , John Wiley Mechatronics-HMT/ Mc Graw Hill .
2. Machining and CNC Technology / Michael Fitzpatrick / Mc Graw Hill.