B.Tech 7th sem Robotics and Artificial Intelligence

Lesson Plan

Introduction to NC, CNC Programming (PEC-RAI-715/21)

Lecture no.	Content to be Covered
Unit 1: Numerical Control	
1	Introduction to numerical control
2	NC components, NC coordinate systems
3	Point to point, lined and contouring systems, open and close loop control system, Steps in NC manufacturing, Advantages and disadvantages of NC machines
4	Role of NC/CNC technology in modern manufacturing, Features of CNC machining centre and CNC turning centre
5	Tooling for CNC systems
6	Automatic tool changer
7	Actuation systems
8	Feedback devices: Encoders and linear scale
Unit 2: Input media	
9	Types of input media
10	Punched tape
11	Program tape composition
12	Coding format: EIA
13	Coding format: ISO
Unit 3: Part programming	
14	Introduction, part program composition
15	Preparatory codes
16	Miscellaneous codes, Cutter diameter and length compensation
17	Part programming for lathe machines
18	Part programming for lathe machines
19	Part programming for drilling machines
20	Part programming for milling machines

21	Part programming for milling machines
22	Computer assisted part programming, Computer assisted part programming languages, CAD/CAM approach of programming
Unit 4: CNC and DNC	
23	Computer numerical control: Problems with conventional NC, Introduction to computer numerical control
24	Functions of CNC, Features of CNC
25	Difference between NC and CNC, Advantages, Disadvantages and Applications of CNC
26	Direct numerical control: Introduction
27	Components of DNC system, Types of DNC
28	Functions of DNC, Advantages of DNC; Difference between direct and distributed numerical control
Unit 5: Adaptive control	
29	Introduction
30	Sources of variability in machining, Types of adaptive control
31	Operation of an ACC system
32	Where to use adaptive control, Benefits of adaptive control machining
Unit 6: Robotics	
33	Introduction, Joints and links used in robots, Robot physical configurations
34	Joint drive systems, Robot control systems, End effectors, Sensors in robotics
35	Robot motion systems, technical features of robot-like work volume, precision of movement, speed of movement, weight carrying capacity
36	Programming methods of robot
37	Intelligent robots, Vision systems
38	Applications of Industrial robots