Lesson Plan

Name of the faculty	**:**	**Manoj Kumar Goswami**
Discipline	**:**	**Mechanical Engineering**
Semester	**:**	**5th**
Subject	**:**	**CNC Machines and Automation**
Lesson Plan Duration	**:**	**15 weeks (July-18 to Nov-18)**
Work Load	**:**	**(L/P) (3 Periods/ 2 periods) /Week**

	Theory		Practical
Week	**Lecture Day**	**Topics**	**Topics**
1st	1st	**Unit 1 Introduction-** Introduction to NC their advantages, disadvantages and applications.	Study of constructional detail of CNC lathe.
	2nd	Introduction to CNC their advantages, disadvantages and applications.	
	3rd	Introduction to DNC their advantages, disadvantages and applications.	
2nd	4th	Basic components of CNC machines, MCU.	Study of constructional detail of CNC lathe.
	5th	Input devices, selection of components to be machined on CNC machines.	
	6th	Axis identification.	
3rd	7th	**Unit 2 Construction and Tooling-** Design features, specification of CNC machines	Study of constructional detail of CNC milling machine.
	8th	Use of slideways, balls, rollers and coatings, motor and leadscrew,	
	9th	Swarf removal, safety and guarding devices	
4th	10th	Various cutting tools for CNC machines,	Study of constructional detail of CNC milling machine.
	11th	Concept of CNC tool holder,	
	12th	Different pallet systems and automatic tool changer system	
5th	13th	Management of a tool room	Study the constructional details and working of Automatic tool changer
	14th	**Unit 3 System Devices-** Control System;	
	15th	Open Loop and Closed Loop System	
6th	16th	Concept of Actuators	Study the constructional details and working of Multiple pallets
	17th	**SESSIONAL I**	
	18th	Transducers and Sensors	
7th	19th	Tachometer	Develop a part programme for following lathe operations and make the job on CNC lathe. - Plain turning and facing operation
	20th	LVDT	
	21st	Opto-interrupters	
8th	22nd	Potentiometers for linear and angular position,	Develop a part programme for following lathe operations and make the job on CNC lathe Taper turning operation - Circular interpolation.
	23rd	Encoder	
	24th	Decoder & axis drives	

9th	25th	**Unit 4 Part Programming**- Introduction to Part programming	Develop a part programme for the following milling operation and make the job on CNC milling - Plain milling - Slot milling
	26th	Basic concepts of part programming	
	27th	NC words, part programming formats	
10th	28th	Simple programming for rational components	Develop a part programme for the following milling operation and make the job on CNC milling Contouring
	29th	Part programming using conned cycles,	
	30th	Subroutines and do loops, tool off sets	
11th	31st	Cutter radius compensation	Develop a part programme for the following milling operation and make the job on CNC milling Pocket milling
	32nd	Tool wear compensation	
	33rd	**SESSIONAL II**	
12th	34th	**Unit 5 Problems in CNC Machines-** Common problems in CNC machines related to mechanical, electrical components	Preparation of work instructions for machine operator
	35th	Common problems in CNC machines related to pneumatic, electronic components	
	36th	Study of common problems and remedies	
13th	37th	Use of on-time fault finding diagnosis tools in CNC machines.	Preparation of preventive maintenance schedule for CNC machine
	38th	**Unit 6 Automation and NC system-** Concept of automation, emerging trends in automation	
	39th	Automatic assembly, components of Automation & Types.	
14th	40th	Overview of FMS,	Demonstration through industrial visit for awareness of actual working of FMS in production
	41st	Group technology, CAD/CAM and CIM.	
	42nd	**Unit 7 Robot Technology-** Introduction to robot technology	
15th	43rd	Basic robot motion	VIVA-VOCE
	44th	Robot applications	
	45th	**SESSIONAL III**	